

## EPA & Hydraulic Fracturing - Dec. 10

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12/10/2012	The Fracking Debate; Saudi America; The Renewable Future	Electric Light and Power
12/10/2012	The Fracking Debate; Saudi America; The Renewable Future	Utility Products Magazine - Online
12/10/2012	Cuomo bets on a new face	Times Union
12/09/2012	New York Fracking Rules: Regulators Taking Public Comments On Revised Gas Drilling Regulations	Huffington Post, The
12/09/2012	EPA: Fracking may cause groundwater pollution	KENS-TV - Online
12/08/2012	Cows Dropping Dead, Farmers Getting Sick: How Fracking Is Threatening Our Food	Care2 News Network

## **EPA & Hydraulic Fracturing - Dec. 10**

### **Encana Calls on EPA to Abandon Pavillion Test Wells InsideClimate News**

**12/10/2012**

The company in the center of a groundwater contamination debate thinks the U.S. Environmental Protection Agency should abandon its monitoring wells near Pavillion and refocus its investigation.

Officials representing Encana Oil and Gas said on a conference call Thursday that the federal agency's investigation into whether natural gas production has contaminated groundwater in the Pavillion gas field is flawed and needs a clean start.

The call was scheduled two days before the one-year anniversary of an EPA report tentatively linking hydraulic fracturing to groundwater contamination east of Pavillion. During the call, company officials were critical of EPA methods used in the drilling, collection and sampling processes used by the agency to test local groundwater.

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## **The Fracking Debate; Saudi America; The Renewable Future Electric Light and Power**

**12/10/2012**

CHRIS HAYES, MSNBC ANCHOR: Good morning from New York. I'm Chris Hayes.

Egyptian newspaper, Al-Ahram, reports that President Morsi will issue a law giving judicial immunity to the military as it quells protests there. Demonstrators are marching in Cairo to protest Morsi's attempt to push through a new constitution written by his allies.

And Charlie Crist, the former Republican governor of Florida who ran for Senate as an independent in 2010, announced late Friday that he is officially joining the Democratic Party.

Right now, I'm joined by Dave Roberts, a staff writer covering energy and politics for Grist.org, Tanya Fields, an urban farmer and founder of the BLK Projek, which promotes urban agriculture and small business creation by Women of Color, Dan Dicker, author of "Oil's Endless Bid: Taming the Unreliable Price of Oil to Secure our Economy," a CNBC contributor and president of Mercbloc, an independent wealth management firm, and Uni Blake, director of environmental affairs for Hometown Energy Group, an independent energy consulting firm with clients in the oil and gas industry.

Republican senator, Rand Paul, of Kentucky on Wednesday lambasted the actress, Ashley Judd, who is reportedly considering a run for Senate there. Paul said Judd's politics were too far left for Kentucky and that her opposition to one industry in particular would doom her candidacy.

(BEGIN VIDEO CLIP)

VOICE OF RAND PAUL, (R) KENTUCKY: She's way damn too liberal for our country and for our state. She hates our biggest industry, which is coal. So, I say good luck bringing the "I hate coal" message to Kentucky.

(END VIDEO CLIP)

HAYES: But as it turns out, Paul's comments reveal a fundamental misunderstanding of his own state's economy. According to data from the Bureau of Economic Analysis, first caught by political researcher, James Carter IV (ph), mining is only the 13th largest industry in Kentucky by GDP. Manufacturing is at the top of the list.

And if you go by jobs, mining is only 15th in the state, employing only about 30,000 people. Health care is at top of that list with almost eight times the number of workers. So, Paul's claims are just flat wrong. They, nonetheless, reveal a deep anxiety and defensiveness about the coal industry, which is very much on the wane in America.

Today, coal provides only a third of the nation's power down from nearly half. Just four years ago, coal-burning power plants are shutting down across the country. There's a war on coal as you may have heard during the campaign, but the aggressors aren't bureaucrats or environmentalist.

The biggest culprit in the demise of coal is a rival energy industry, natural gas, specifically, the technology that has radically transformed natural gas production over the last years something called hydraulic fracturing or fracking. The name is incredibly opaque, but the goal is simple. Tens of thousands of feet below the surface, there are deposits of natural gas trapped within giant rock formations.

Fracking lets energy companies drill down and get those deposits by pumping a mixture of water, sand, and chemicals into the rock to release the gas. That process has fundamentally revolutionized America's energy economy in just a few years. The average annual price of natural gas is less than half what it was in 2008.

Large swaths of the United States from Colorado to Texas to Ohio to up state New York have massive natural gas reserves making them right for fracking. Residents for (INAUDIBLE) based primarily on concerns about health and the safety of the process. Those battles may well decide the course of America's energy economy over the next century.

I think there's a real mismatch between the amount of -- between the scale of the change that's happening in America

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right now because of the fracking boom and the amount of intense consternation, debate, and politics around the local level on the amount of coverage it's getting naturally. It's sort of this thing that's happening under the radar.

Natural gas, the natural gas revolution that's happening right now is -- you're someone who works in the energy sector. You're a trader in the energy sector. It's fundamentally transforming the economics --

DAN DICKER, CNBC CONTRIBUTOR: And it's new. And that's what needs to be -- you need to say that clearly. This is in its absolute infancy, fracking as -- it's been going on for one time, but deep fracking that they're doing now really only began in 2007 in Texas in the Haynesville, and it's been moved quickly into the major place.

So, we've gotten at a very strange kind of movement in the timeline of fracking. It's run almost haphazardly in three different directions from the industry, which has gone unto a land grab bonanza and a mania into a fracking without much regulation and much oversight that has started with it. Now, I'm not saying what's been done has been badly done.

Most of it has been well-done, but there's been bad examples of bad wells fracked out there. And, what it is it's going at a break neck pace now trying to capture what is what you say is a boom that's just begun.

HAYES: Dave, is there -- I mean, I guess, you know, at the top line you say, look, there's this huge, plentiful source of energy. Here's the president talking about fracking and its promise in Ohio in July.

(BEGIN VIDEO CLIP)

BARACK OBAMA, PRESIDENT OF THE UNITED STATES: Not only are we blessed with incredible natural gas resources that are now accessible because of new technologies, but natural gas actually burns cleaner than some other fossil fuels and is an ideal fuel energy source that we potentially can use for the next 100 years.

There are a lot of folks right now that are engaging in hydraulic fracking who are doing it safely. The problem is is that we haven't established clear guidelines for how to do it safely and informed the public so that neighbors know what's going on. And, you know, your family, you can make sure that any industry that's operating in your area, that they're being responsible.

(END VIDEO CLIP)

DAVE ROBERTS, GRIST.ORG: Yes. Part of the fracking being so new, like you said, especially deep fracking being so new is that there's just a lot we don't know about it. We just -- it does burn cleaner than coal in power plants. That's pretty uncontested, but if you go look at the, say, methane released by fracking and by transporting this stuff through pipeline, there's a lot of methane released, and methane is a very powerful greenhouse gas as well as CO2.

So, the balance in terms of climate change between natural gas and coal is still somewhat a question mark. It looks based on most science we have now cleaner than coal, but we just don't know. We just don't know a lot about the local impacts. We don't know how long these prices are going to stay low.

We don't know how long these wells are going to last. We really -- there's a lot we don't know about it, and it's moving so quickly. I think that's why you see a lot of this.

HAYES: There's a lot of fear.

ROBERTS: -- at the local level.

HAYES: Yes. And you're someone who is familiar with this. You live in upstate. You've consulted for the oil and gas industry and you're a toxicologist, right? What are the fears you hear, and what's your feeling about how people are understanding the process?

UNI BLAKE, HOMETOWN ENERGY GROUP: People are not understanding the process at all. The information is out there. The industry has been doing this for a while. They have the information, but the problem is a lot of people don't believe what the industry says.

HAYES: Right.

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BLAKE: So, even if the industry --

HAYES: Which is not ridiculous. Let me just say it for the record, right? I mean, like, you know, this is just as a basic kind of -- I mean, I think you're right, right? What ends up happening is there's this -- you get this debate, right? And, you know, the natural gas company says X and a group of activists say Y.

And I as a third party entering into this, I say, well, the natural gas company has, you know, hundreds of millions if not billions of dollars riding on X being the case. I'm going to view it a little skeptical.

BLAKE: I understand what you're saying, but if you want a solution to a problem, then, sometimes, you know, you have to look within. The industry has spent a lot of years doing research on a lot of these issues. All you have to do is go to, let's say, SPE. They do an annual conference, and they have a lot of information there, a lot of reports about health issues, about water issues.

But the problem is, again, nobody wants to believe what the industry is saying. And so, you have the environmentalists putting their reports out, and then you have the industry saying, well, we don't want to believe what you're saying either. And so, we're at a really bad impasse. At some point, we have to come together and decide, you know, what is and what is not.

TANYA FIELDS, THE BLK PROJEK: Because the people don't -- you say they don't believe what the industry is saying as if we were all inherently naturally skeptics if there's not a history that would lend to that. We have people in towns whose water is flammable, whose livestock are delivering calves and breeds that die before the year is over.

Disproportionately, two instances before there was fracking, right? This country has a long history in terms of the industry dominating and saying one thing, and people actually putting their trust that what they're saying is the truth and then turning around and ending up with billions of dollars in public health issues degradation of their environment, disinvestment of their local economic development.

And, of course, I wouldn't believe what you said. You're asking the fox to watch the henhouse, essentially. So, there is a lot of investment in telling people, you know -- what they -- not telling them anything, right? Chemicals are looked at trade secrets.

HAYES: Right.

FIELDS: So, you're put tons of chemicals into the -- potentially into the water table -- water table, and you're not telling them because it could help the competition.

DICKER: Look. There are real environmental challenges with fracking. They are real. They are measurable. We are getting a handle on these, but the idea that they are infecting water tables is a bit overwrought. We've had well over 40,000 wells fracked in this country. The EPA has found one kind of species example of some sort of water table activity in Wyoming.

Even they're not sure about that one. It seems the water table -- now, a greenhouse gas effect of loose methane, that's real. In terms of water that's coming up, recyclable water that's coming up as brine after the fracking process, that's real, in terms of (INAUDIBLE) we have to separate what --

HAYES: Let's do that, because I do think -- I think there's a bunch of stuff on the table, right? And the part of this, it's a complicated process, and it's a scary process in the fact that these are areas that, you know, West Texas is used to energy extraction, right? Southeast Pennsylvania is not necessarily used to it or upstate New York is not used to it, right?

So, all of a sudden, you have this industry that's coming in. So, I want to sort of step through these different risks, because I do think there are risks and I do think there's a little mix of anecdotal fear and then some real -- but there's also very grounded reason to be skeptical about a lot of the processes. So, let's sort of dive deep into that right after we take this break.

(BEGIN VIDEO CLIP)

UNIDENTIFIED MALE: It's all settled out, but that's what our water looked like.

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UNIDENTIFIED MALE: That came just out of the tap?

UNIDENTIFIED FEMALE: Out of the tap.

UNIDENTIFIED FEMALE: So, in three weeks, they contacted me by phone and said, we've tested your water. There's nothing wrong with your water.

UNIDENTIFIED MALE: With this?

UNIDENTIFIED FEMALE: With this. There's nothing wrong with the water that will be affected by the oil and gas production in your area.

UNIDENTIFIED MALE: Whoa! Jesus Christ!

(END VIDEO CLIP)

HAYES: So, that's the iconic moment from the "Gasland" documentary. And it's incredibly affecting. And I think -- Tanya, you made this point about water contamination. I think, basically, look, you're drilling down. There's the water table. You are fracturing the shale. Right now, the aquifer tends to be much, much, much, much higher up in the earth than where the actual fracking is happening.

Yes. A mile maybe, but the question of ground water contamination, I think, looms incredibly large, and I want to get your sense, Uni, of where your sense the specter of ground water contamination.

BLAKE: Well, time has said a lot of things, and a lot of it have to say is based again on misinformation. We live over shale, and this is a gas-producing shale. I have tested water in Oswego (ph) County, and 20 percent of the water that we have tested with no gas drilling occurring already has methane in it.

There've been people lighting their faucets in our area for a long, long time. Ask any of the old (INAUDIBLE) that live in the area. It's something they did as kids. It was fun.

HAYES: Right.

BLAKE: So, the methane is in the water.

HAYES: Let me say this, and this is an important footnote. I don't want to litigate "Gasland" too much, but the natural resources department of state of Colorado are going to follow-up investigation into some of the examples of the -- in three of the instances that are shown in "Gasland," and their determination was in two those instances the methane coming was this sort of natural what's called biogenic methane.

HAYES: No, no, but in one of them, in one of them, the Department of Natural Resources found it was due to a poorly constructed well, and a poorly constructed well with improper casing, the disposal of the wastewater which comes up by the millions of gallons and sits there in a toxic pool and has to be transported out or put somewhere, right? If you don't do any of those steps (ph) along the way properly, you can get massive contamination.

BLAKE: I think the definition of the word "toxic," again, a toxic pool, a toxic -- cocktail, toxicity has many -- is a combination of many different things, OK? Number one, toxicity is the length of exposure. How long are you exposed to if? Number two, toxicity is, obviously, a concentration thing.

Toxicity is also, you know, is it chronic? Is it acute? If you sit here drinking coffee, OK, are you drinking a toxic solution? Do you consider your coffee toxic?

HAYES: I sort of do, but continue.

ROBERTS: Worth it.

(LAUGHTER)

BLAKE: Well, caffeine has an LD-50 of 190, which means that the 190 mg, two liter, (ph) half the critters will die if they

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given caffeine. One of the toxic chemicals has an LD-50 of 143. So, the whole point is it's all relative.

HAYES: But let me tell you something, if you went to the folks in the Marcellus Shale or upstate and said, you know what, we're actually swapping out the fracking chemicals we're using with coffee and we actually have eight million gallons of coffee sitting around, no one would be psyched about that either.

HAYES: I mean, that's the point is that the volume of what you're talking about is on a scale that is -- that is worrisome to people.

BLAKE: Can we put the word toxic out of the conversation?

FIELDS: But I don't think that we should. And let me push back a little bit, because we're talking about this as if this is the end-all be all, right? We heard President Obama say we could do this for 100 more years, but we act as there's no other alternatives, that we have deliberately ignored.

HAYES: Right.

FIELDS: And that we have not put the proper resources into actually looking at, right? We're not looking at making sure that we have a country that really is focusing on energy efficiency, looking at real clean energy that's actually renewable energy, because that doesn't make as much money as natural gas, right?

And, it also doesn't open up the same kind of economic development benefits for folks, right, when we start talking about green (ph) jobs. All like you said, it's all relative. That's a really important point.

HAYES: This --

HAYES: -- and I think it's also interesting, because what the fracking boom is doing to the price of natural gas. I mean, I think the idea, right, is the price comes down and that's good for consumers. Energy is cheaper. But it's having a lot of knock-on effects, that diminution (ph) of price.

ROBERTS: Yes. Let me say what I think about water before we move on --

HAYES: Yes.

ROBERTS: -- because it's a point worth making. It's true that the fracking steps (ph) is taking place well below the water table, but what you have is very slow dispersions, very low concentrations, and extended contact. And we just don't know a lot about that. There's a big question mark there.

HAYES: OK. But there -- no, but there are some of it -- look, some of the things we know, right? We know some of the chemicals that are in there --

HAYES: here's an example of this.

BLAKE: Yes, we do.

HAYES: Some city or neighbors (ph) industry pumped a mixture of chemicals identified only as EXP (INAUDIBLE) 17311 into half-dozen oil wells in rural Karnes County, Texas in July. This is from Broloomberg. One ingredient and other identified solvent can cause damage to the kidney and liver.

The solvent and several other ingredients to the product are considered a (INAUDIBLE) by superior well services, the neighbor's subsidiary (ph). That means they're exempt from disclosure. Drilling companies in Texas claim similar exemptions about 19,000 teams this year through August. So, there are -- just as a matter of fact, there are chemicals that are being put in the ground that are not disclosed because they are --

DICKER: Part of the legislation is designed to make this transparent, by the way. I think within the next year, you will see transparency entirely in whatever cocktails they're throwing down these wells, because I don't think that they are so proprietary. And even the oil companies said they're not so proprietary that they can't keep up --

HAYES: Also, all the companies are spying on each other all the time. Who are they kidding? They all know --

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BLAKE: A company could not do any work in New York State without disclosing what chemicals they're going to use. The DEC will not issue any permits, unless, the DEC knows what chemicals are in those proprietary mixtures. The same with the coffee (ph) drink, OK? It has chemicals in it. You know what they are. What you don't know is whatever the -- I mean, the different amounts of the chemical.

HAYES: What are the requirements under the DEC, because it seems to me that part of the problem also is regulation, right? I mean, there is a fear that this is being inadequately regulated or nowhere near, you know, regulated enough. And I want to talk about that and talk about the solutions here.

There are some people who think there should be a ban like there is in France. There are others who think that you can do this in the regulatory margins. Let's talk about that when we come back.

HAYES: We're talking about fracking, which is an incredibly pitch battle. It is transforming the economics of energy in the country. It's transforming many local landscapes places that used to be farms or little league fields now sporting wells. There's a rush of capital into natural gas.

I think, in 2011, I want to say five of the top ten performing stocks were associated with natural gas extraction. It's true. Look it up.

(LAUGHTER)

ROBERTS: Not the ones I own.

(LAUGHTER)

HAYES: And there's lots of fears about what its environmental effects will be, what its health effects will be, and we're trying to sort of tease through some of that, and we're talking about water contamination and my sense of the literature here is that the ground water contamination through the fracking process, itself, has been documented in extremely rare cases.

But, contamination of water because you have all this wastewater, right? I won't call it toxic. You have this wastewater that is a slurry of things that you probably will not want to opt to put in your body. And you have millions of gallons of it, and then you have to do something with it. You got to truck it out or you got to let it sit there and essentially off-cycle, I guess.

You know, what you do with that. And then, I think also, you come back to this -- we're talking in the broad sense about a risk profile and about regulation, right? You know, deep water drilling is safe, right, when done correctly. And then it's fine until it's not done correctly, right? We've all seen what that looks like when it's not done correctly.

There's a question. Let me give you a little statistic here. Active oil and gas inspectors per well in 2010 by state. This is the amount of active wells there are per inspector, OK? And the amount of the percentage of wells inspected. In Colorado, 63 percent of the wells were inspected, and there were nearly 3,000 wells per inspector. And in a state like Pennsylvania, 91 percent and 1,400 per inspectors.

So, even in the best states, right, New York actually is in the top there in terms of the number of wells per inspector. There is this question, this broad question about whether we believe. It gets down to this trust issue, right? If you say theoretically this can be done safely under the right conditions with the right regulation, it can be done safely, there's this basic trust question about, do we trust our political system to bring about those conditions?

ROBERTS: Yes. And you know, the story of what happens when a resource is found in a rural, remote areas among politically powerless people has played itself out many, many, many times over the past, and eventually, you have to learn from history. There's always these anecdotal complaints, there's always experts from industry saying there's nothing to worry about.

There's a flood of capital, out of state capital, and out of state workers, you know, the economic boom that is inevitably temporary. And then, once everything has moved on, you find out that these towns end up being wastelands and, you know, some of the health concerns prove out and some don't.

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But right now, they're just -- you know, there's motoring through it before the science and before the regulation can catch up even close.

DICKER: One of the issues you bring up about trust and our government being able to regulate this, and you talk about, for example, deep water drilling. Now, that's federal, because that's federal water and you need federal permission. You need to follow federal regulations and other (ph), but the fracking debate is difficult because it's state-run for the most part.

HAYES: Yes.

DICKER: And every state environmental agency has control over each state which is why you see, for example, a lot of discussion about the Marcellus in New York where a lot of people are up in arms and really care about the environment to a certain degree, and you don't see that much in Texas, for example, in the Eagle Ford and in the Haynesville and other areas (ph) in Texas because Texas is a more happy kind of fracking state which has a lot easier --

ROBERTS: Intense pressure on state governments to grab what economic boom they can when they can, which is a lot more difficult to resist.

DICKER: What it does is it adds to the difficulty of getting a unified sort of trust going in terms of the technology itself, because each state looks at it differently.

HAYES: My sense is your position is this can be done safely and largely is being done safely now. Obviously, there are exceptions to that, but largely (INAUDIBLE). Are there standardized rules that you would like to see as someone who does think that should be done safely, you would like to see put in place to ensure that always happens?

BLAKE: Have you reviewed the New York supplemental GIS? Two thousand pages worth of regulations. Just to kind of backtrack, there's a lot of discussions going around this table, I wanted to bring up the wastewater issue since we keep alluding to it.

The wastewater as we know, obviously, is regulated under the Clean Water Act. There's been a lot of talk about this Dick Cheney and the Halliburton loophole.

HAYES: Let me just say there's an exemption put in 2005 essentially exempting from the drilling process from a particular kind of scrutiny required by federal law in the Safe Drinking Water Act.

FIELDS: There are six other federal acts that it is exempted from.

BLAKE: Yes. That's a federal.

HAYES: Right. Yes. That's a federal exemption, right.

BLAKE: He alluded to the fact that this issue is actually regulated at the state level. And so, the state is the one that manages the Clean Water Act. If you go through the SGIS and you look at it --

HAYES: Explain what the SGIS is.

BLAKE: It's a Supplemental Environmental Impact Statement that New York State requires, you know, for the industry to get its permits. A part of that Clean Water Act at the state level is a program called NPDES program, which is where a wastewater discharger gets a permit. And so whatever they put out in the wastewater is monitored.

And so, if the industry supplies them with wastewater, the wastewater treatment plant is expected to clean it up to the level that meets their permit regulation. And so, that permit is under the Clean Water Act. For people to go around and say that the industry is not regulated by the Clean Water Act is kind of twisting words, because their wastewater is at the wastewater outfall.

DICKER: There are some trace chemicals and others that are not under the Clean Water Act that happen to come up inside when fracking fluids come back up out of the ground. They're in the ground naturally, and they come back up as wastewater. Some of those are not covered in terms of the route that they have to go in order to be cleaned up and then released into rivers and so forth here. Most of them are. Most of them are, but some are not.

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BLAKE: The permit is the one that determines what that wastewater plant is supposed to put out.

HAYES: Right. Yes. But the collection of the information is highly non-standardized, right? I mean, you're talking about New York State, and New York State has had -- and let me just say this, the background to New York State, right, which has a relatively high level of regulatory scrutiny is precisely the presence of fracking activists, right?

It wasn't just that they magically thought, you know what, let's have really tough standards on this. No. Actually, people showed up at meetings and yelled and protested, right? And so, my point is that if you're -- often the industry will point to regulatory bars that they have to clear and say, look, we have to clear these bars.

Those regulatory bars don't come around (ph). They don't just sprout out of the ground. They come about because --

DICKER: -- states like New York --

HAYES: Tanya Fields, founder of the BLK Projek and Uni Blake, director of Environmental Affairs for Hometown Energy Group. That was really a great discussion. I want to continue it in the future.

David, you mentioned something about the way that fossil fuel extraction can change the political, economic facts on the ground of a place. The U.S. is on tract to become energy independent. Why that's bad news after this.

HAYES: My story of the week, Saudi America. Right now, in Dickinson, North Dakota, the local McDonald's is offering up \$300 signing bonus to new employees. You heard that right, but 7.7 percent nationwide unemployment rate, persistently sluggish job growth, and wage stagnation, the labor market of this one town in North Dakota is so tight, and employers are so desperate for workers, they're offering a signing bonus for a job slinging fries.

And it's not Dickinson. Unemployment in the entire state in North Dakota is 3.1 percent. GDP growth in the state is a whopping 7.6 percent, and housing there is in such short supply (ph) that one bedrooms are renting for more than \$1,000. What economic miracle has taken place in the plains (ph), you might ask, to bring this about?

The answer is the Bakken formation, a subterranean rock formation that contains a thin, and until recently, more or less inaccessible sea of oil within relatively hard rocks. The revolution in the technology of its fraction, including fracking has helped unlock the oil in the Bakken and some speculate that the amount of extractable oil from just this one geological formation alone could surpass the reserves of all of Iraq and Kuwait combined.

Production from the area has skyrocket and this new production boom is driving a larger national trend, pushing U.S. oil production up for the first time in a generation and arresting what many believe was a permanent decline. This chart shows the comparative growth in crude oil supply among a number of non-OPEC countries.

And what you see is the U.S. obliterating the rest of the world. Employment in oil and gas extraction has surged to the highest level since 1992, though, we should note they still provide a tiny, tiny sliver of the country's job just under 200,000.

Our net oil imports are crashing (ph) as you see here, and now, a number of analysts are predicting that in the near future, the U.S. will be producing more oil than any other country in the world. By round 2020, a recent international energy agency report predicts the U.S. is projected to become the largest global oil producer and starts to see the impact of new fuel efficiency measures and transport.

The results in a continued fall in U.S. imports to the extent that North America becomes a net oil exporter around 2030. Yes, that's right.

The United States, which is according to the spokes fuel from the coal industry already the Saudi Arabia of coal, which is, thanks to the fracking revolution, now essentially tied with Russia as the single largest producer of natural gas in the world could also once again find itself the world's biggest oil producer on a consistent basis for the first time since the first half of the 20th century.

In energy circles, you're beginning to hear the phrase "Saudi America" used to refer to this future fossil fuel juggernaut. And you might look overall this and say fantastic. America is finally within sight of that much mythologized, long promised destination, energy independence.

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Not only will we be able to cheaply supply our own power grid, vehicles, and army, we'll actually be able to make money, exploring our resources all over the world reversing the long trend towards ever widening trade imbalances. And indeed, during the campaign, this was more or less the argument President Obama made.

(BEGIN VIDEO CLIP)

OBAMA: We have increased oil production to the highest levels in 16 years. We're actually drilling more on public lands than in the previous administration. We're less dependent on foreign oil than any time in 20 years.

We're moving in the right direction in terms of energy independence.

We've built enough pipeline to wrap around the entire earth.

(END VIDEO CLIP)

HAYES: But delighting in our carbon extraction boom is staggeringly almost psychopathically perverse, because, well, it's exactly that carbon extraction that is hurling the world toward the dystrophic (ph) future, a possible four-degree Celsius global temperature rise, droughts, floods, storms, disaster, disease, death, crop failure and on and on.

In other words, you cannot separate energy policy from climate policy. There are one in the same. And based on calculations by Bill McKibben and the rest of the folks in 350.org, only one fifth of the current proven world fossil reserves which includes everything, oil, gas, everything, can be taken out of the ground and used without our planet passing the critical two-degree increase threshold.

In other words, 80 percent of the fossil fuels that we, at this very moment, know we can take out have to stay in the ground. But there's another related threat posed by the ramping up of our fossil fuel extraction, and that is as America begins to ape (ph) Saudi Arabia's productive capacity, it also begins to more closely resemble politics.

Economists have long talk about the resource curse and the fact that countries with massive, lucrative natural resource found this tend to be developmental and governance basket cases ruled over by a tactless (ph), ruthless, in trend set (ph) of extractive oligarchs (ph). And if you think that sounds foreign, go take a look at the politics in places like West Texas and West Virginia.

The promise of energy independence is a kind of liberation, but it is a false promise. If history or a look across the globe tells us anything it's that the extremely lucrative industry of extracting and selling carbon fuel offers all of the actual freedom of the devil's handshake. How we escape it after this.

HAYES: We are talking about the remarkable fossil fuel extraction boom that is happening in the United States leaving some energy analysts to refer to Saudi America as the U.S. becomes possibly the top producer in the world of oil in the near future. It has the largest known proven coal reserves in the entire world and is tied with Russia for the largest natural gas annual production.

Joining me at the table is Kathleen McGinty, senior vice president and managing director for strategic growth at Weston Solutions, Inc., a company which does green property renovation, Steve Coll, author of "Private Empire ExxonMobil and American Power," which is just a remarkable book, and president of the New American Foundation.

He's also a staff writer at the "New Yorker" magazine. Frances Beinecke, president of the Natural Resources Defense Council, and Dan Dicker is still at the table.

I'm really curious about how this boom is going to transform American politics. And I'm particularly concerned about climate, right? Because it seems to me that we are basically in certain ways headed in exactly the wrong direction, but also, at the same time, headed in the right direction. And here's what I mean by that.

Carbon emissions are the lowest in the country since 1992, right? And that is largely because every BTU of natural gas you substitute for BTU of coal, you basically get 50 percent of the emissions. So, at the same time, we're having this fossil fuel boom. We're also having this decline in our carbon emissions. And so, I wonder, how should I feel from an environmental perspective about these two facts that seem to be in deep tension with each other?

FRANCES BEINECKE, PRESIDENT, NRDC: I think the main thing, Chris, is that we have to get on a path way to reduce

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emissions over time. Natural gas is better than coal, but it does not get you there. And you have to have a clean energy plan that gets you to a cleaner solution, which includes efficiency and renewables and the cleanest burning fuels that you can get.

And basically, the natural gas boom is a temporary benefit from a climate standpoint, but a long-term disaster because it prevents the transition from happening.

KATHLEEN MCGINTY, WESTON SOLUTIONS, INC.: Yes. Chris, right now, we're in a position where because of the production of gas at such great levels, it has caused the price of that gas to come down precipitously. Now, that turns out not to be very good for the gas companies who aren't making the money that they were making.

HAYES: Right.

MCGINTY: They're shutting in some of those wells, but it also turns out not to be very good for the renewables --

HAYES: Right. Who are now have to compete with this --

MCGINTY: Exactly. And it's pretty darn hard to finance that renewable project when the price of gas has brought that price of electricity down.

HAYES: But I'm also really worried about the political economy here, because to me, this seems a big issue, right? It's like, if you're going to actually have a climate policy, you have to go through the fossil fuel companies.

MCGINTY: Right.

HAYES: And the fossil fuel companies are big and mean and tough. And they are some of the most profitable companies in the history of human civilization. And you've written entire magnum opus about one of them.

And I wonder what you think, how is this going to shape the political relationship between the state and its ability to bring to heel these companies if we have this massive expansion in the extractive capacity of the nation?

STEVE COLL, AUTHOR, "PRIVATE EMPIRE": Well, the basic problem is that while it's true that climate and energy policy are the same thing, and our politics, they're not integrated. We don't have a government. We don't have a democracy that can bring those two policy strands together, and part is the political power of the fossil fuels industry.

Between 1998 and 2012, the combined spending in Washington disclosed lobbying spending of the oil and gas industry and the electric utility industry \$3.5 billion. Pretty much top of the chart. And that means that they have a kind of blocking position in Congress. So, when -- even when you had a Democratic House in 2006 and a Democratic presidency in 2008, we couldn't get a price on carbon enacted, even a relatively modest one.

Now, we had a recession. There were extenuating circumstances, but people understand that the politics of putting a price on carbon-heavy fuels, which is the easiest way just start to integrate climate energy policy is pretty much dead in the Congress. Even now, you don't even hear the president talking about it in the campaign where you had the opportunity to start to set that agenda.

BEINECKE: So, Chris, on that point, the fact is that the president has the authority to reduce emissions under the Clean Air Act. He can do it efficiently, he can do it cost-effectively, and I think that grassroots from all over the country are going to be demanding that action from the president and from this administration.

HAYES: In fact, the natural resources defense council just put out a wonderful report, which I recommend earlier. We'll put out on our Facebook page and our blog and our Tumblr, basically, sketching out what that will look like, how -- because the EPA has found it can regulate it under --

BEINECKE: The Supreme Court authorized the EPA to regulate it under the Clear Air Act. And our program basically promotes massive investments in efficiency to reduce emissions 26 percent by 2020 from the power sector of largest single source of emissions in this country. So, we have to get on a path to reducing our emissions. We have to use the authority we have.

As Steve says, Congress doesn't have the appetite now. Hopefully, at some point, they will, but we can't wait for them.

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DICKER: I think you got to give Congress the appetite and Steve -- to make the -- put the politics into the climate and into the energy equation, and this is the way you do it. I think this president has a tremendous opportunity, one that no other president has had because of the infancy nature of both fracking of natural gas and the shale oil, as you say, in the Bakken, and what's going on deep water in the Gulf of Mexico.

This is we're at a moment in time where we're at the infancy of a great revolution, as you say, and there's a moment where you can say -- the president can say, I'm going to have a consolidated energy policy, the first of its kind in the last 50 years where if you want \$5 billion in subsidies for big oil, then you're going to have to pay for that with \$5 million of getting us further along the way towards a renewable future.

And if you don't do this, then you're not entitled to this. You have to integrate everything so you can use a hammer, the hammer of money against the big oil companies to make that move forward in the renewables that they won't do by themselves.

HAYES: Kate, I want to hear some thoughts on this right after we take a quick break.

HAYES: Kate, you have something you want to say.

MCGINTY: Well, on energy policy, I agree. It needs to be an integrated comprehensive energy policy, but here's the point. Even then as since as some gain (ph), who's producing the electrons where they coming from? I'm hoping we can expand the equation beyond that, and what am I talking about?

What about the value enhancing end uses of either oil or gas where you're using it not necessarily as an energy source primarily, but you're keeping those good jobs in the United States by using it as a feed stock for high-tech industries or pharmaceuticals or chemicals or fertilizers, that kind of thing. If you can do that, it may dial down some of the animosity between fossil fuels and renewables as it relates to electricity or transportation fuels.

HAYES: But that animosity seems to me like that animosity exists at this table but like it barely seems to exist at Capitol Hill. I mean, it's just like -- you know what I mean? It's like Goliath and then like David's puppy poodle in terms of like the size of the industries that we're talking about.

BEINECKE: That's absolutely true, but I think the other thing that's happening and it's happening on the ground across the country is they're climate victims from all the energy development that's going on. The people who's homes are being affected in Pennsylvania, the people who lost their homes in Staten Island and the Jersey shore from hurricane Sandy, the people who live along the Keystone Pipeline.

I mean, there are people across the country who are beginning to rebel against the huge fossil fuel development that is taking over their communities. I think that's the counterweight. It's going to come from the grassroots. It's going to demand -- it's going to end up in Washington.

COLL: I think that's the key point, because you look at the history of environmental movements in this country.

The American people, including in red states, have proved themselves willing over and over again to tax themselves to address current risks to their health, their children's health, their communities, their water supply, the air they breathe. The problem with climate to date has been -- that it has been seen as a future risk, and it's coming forward, and as it does, the politics are going to change.

HAYES: The politics also change -- you made this really interesting point during the break about geography of it changing, right? It's like well, we know -- we basically know how the senator from West Virginia are going to vote on stuff that has to do with coal. Democrat, Republican, Marxist, whatever.

I mean, whoever you would elect from West Virginia, they're going to vote a certain way on coal. And the fact that we now have this incredibly distributed development because of the fracking boom means that a lot of different places now are geographically playing and that can go two ways, right?

One way is we produce more senators from the state of West Virginia and how they vote. The other is that we produce this broad grassroots activism that actually has some political traction.

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COLL: Well, the effects of a national politics, too, because look at this last election. Why was President Obama as muted as he was about climate and about oil and gas and coal production? Well, Virginia, Colorado, Ohio, Pennsylvania. These are --

DICKER: Michigan.

COLL: You know, this -- and the way our Electoral College --

COLL: -- we only worry about ten states that they're very invested in oil and gas production.

MCGINTY: Some of it says come back to the economics as well. I look at my own state of Pennsylvania where we had the early stages of huge boom in the Marcellus shale. Hundreds and hundreds of wells being deployed. Some companies now are down to just a couple wells. Well, why? Because that price has plummeted.

HAYES: Right.

MCGINTY: The reason why it's relevant to the politics is if this genuinely does become a boom and bust, then those politics that get really engrained when a big part of the state's economics depend on that industry, maybe that doesn't take hold. That's where I think it's interesting in terms of those end use industries, if you can see them come in, you have a different equation with that same resource.

HAYES: I want to talk about the price that has happened, because that's the background for all of this, and this is what consumers tend to care about and voters, particularly, when we talk about price of the pump and Wolf Runner (ph), the role of people filling up here on cable news.

And, my sense is that the price of energy in some ways is too low at a certain level right now, and I want to talk about that right after we take this break.

HAYES: Good morning from New York. I'm Chris Hayes here with Kathleen McGinty from Weston Solutions which does green property renovation, Steve Coll, author of "Private Empire ExxonMobil and American Power," CNBC contributor, Dan Dicker, and Frances Beinecke of the Natural Resources Defense Council. And we are talking about the massive, extractive energy boom that's happening in America right now. How it's transforming our politics? What it might do to our politics in the future and how that can be made to work with a same climate policy, which is really the difficult question.

And I -- before the break, I left the question on the table about the price of energy being too low right now, that basically what we've seen is this massive amount of supply has come onto the grid, thanks largely to natural gas. The price has come down. And, I think we generally think, oh, lower prices are better.

But, it seems to me that there's a lot of problematic stuff about the price coming down as sharply as it is right now in terms of what incentives it provides for things like efficiency et cetera.

DICKER: Yes, you would want the prices to go up a lot because it would drive the next stage towards renewables and would make that at least cost-effective. Algae fuel, for example, we talk a lot about that. But --

HAYES: Some people talk a lot about that.

DICKER: The cost is about \$8.50 to \$9 a gallon, compared to gasoline as it is now.

So, you want the prices to go up to make this a little more cost-effective to drive the technology into them.

Unfortunately, it's actually going quite the opposite. You talk about increased supply here in the United States. In fact, overseas demand is dropping. We are still in the midst of an economic problem in Europe. Chinese growth is going down. Indian growth seems to be going down.

In this country, we've certainly done better in terms of the efficiencies and our demands are starting to drop. So, in terms of what economically you can expect, you will expect the opposite -- or at least I do -- over the next several years that oil prices will in fact go lower, natural gas, in fact, you can -- you know, because we have a futures market, we look forward to the future and see what people are betting the price is going to be. That doesn't go over \$5/Mcf until 2020 according to the futures markets.

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So, although you might want -- we have to drive the renewable argument some other way, because price doesn't look like it's going to do it.

BEINECKE: The only thing to change that is if we put a price on carbon.

HAYES: Right. That's the big --

BEINECKE: The fact is that externalities of all the fossil fuel development are not incorporated in the current price, so the environmental effects, the health effects, the consequences to communities, none of that is factored in. We have to change that and get a price on carbon, drive it up so that we can promote renewables and efficiencies first and foremost.

HAYES: And part of what's so strong about the politics of all of this to me, and I always -- it always strikes me, you know, gas prices go up and then gas prices will briefly dominate the campaign and then, they'll go down. And no one is saying -- it's like completely asymmetrical, right?

If gas prices go up, it's a problem. If they go down, no one is like -- hey, awesome, gas prices went down, I'm doing a victory lap, right? It goes up and it's a problem.

And then, more broadly, when something like Sandy happens, right?

UNIDENTIFIED FEMALE: Right.

HAYES: It's really fascinating to think about this. You know, you lose power, OK? My parents in the Bronx lost power and other people lost it for days.

And all of a sudden, you're like, oh, right. Everything about my life literally every last detail is dependent on this massive invisible infrastructure. I never think about it that a whole bunch of people are running and litigating about and legislating and regulating and making a lot of money off this massive industry that is just like huge mountain I sit at the very top of it, and I live my life.

And then when it goes away, what's the deal? Like how does my utility company actually work, and why can't they get my parents' power restored in a week?

And I think one of the things that's been positive about the fracking boom is it produced this grassroots response in which people are educating themselves about the chain of production of how does a molecule of carbon go from the ground to firing up your grid so you can turn your light on.

MCGINTY: Sandy, too. One of the other things that became very visible with the mile after mile of these poles and wires that are down --

HAYES: Right.

MCGINTY: -- it hit you in the face, that is this what we're running the greatest superpower on Earth? Is poles and wires that get blown down? Is that the way to power a 21st century economy?

I think that could be one of the forces that becomes a bit of a counterbalance to the economics, so that the economics are the toughest one.

HAYES: But the problem is it's so opaque, right? I mean, in the case -- this is why I think the politics get so tricky. It's like I don't -- like what is my utility company? As a citizen, I don't know. He they send me a bill, but like, if you ask how many people work for it or like what degree it's public and private, like all of this is just remarkably shrouded in complexity.

COLL: It is utility regulation that's one area in our economy, where your right to be heard and have public interest in is embedded into the regulatory system, unlike the oil industry and gasoline provision which, as a practical matter, is also a utility function. It isn't regulated in the public interest.

You know, just to come back to this price discussion here --

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HAYES: Yes.

COLL: -- the history of oil and gas prices, the history of commodity prices in general is that they fluctuate. They go up and down. And on the base of price signals, people shut down wells when prices are too low, supply contracts, prices go up, people boom.

HAYES: It's a classic boom/bust thing.

COLL: You can't build pub policy on the basis of extrapolating commodity prices from the present.

HAYES: Yes.

COLL: And so, to go back to the idea that we need a carbon price, which we do, the implications is that politically you ought to enact it when prices are low --

HAYES: Right.

COLL: -- so that you do relatively little damage to the economy.

HAYES: Right, right, right.

BEINECKE: Now is the time. That's a great thing, Steve. We should be doing it right now.

COLL: Right.

BEINECKE: And everyone knows it's coming. That's the other thing. I mean, it's not as though --

HAYES: Do they?

DICKER: I don't think so.

(LAUGHTER)

BEINECKE: You're saying that the utility companies, the coal companies, the fossil fuel industry, this is something they're examining every day. Everyone is looking at what the emissions rate around the world is, the fact that the earth is warming very, very quickly. The arctic is melting in front of our eyes. The city of New York was closed down from a massive storm.

I mean, this is very much present. As Steve said we used to say it's a problem of the future. It's a problem of now, and we have to build the politics to get that result.

DICKER: There's a massive link between flooding in the Brooklyn Battery Tunnel and a carbon tax coming to be, a massive link.

BEINECKE: I think people are awakening to the impact.

COLL: Even ExxonMobil, their corporate planning department, assumes a price on carbon is coming. It's a question of timing and amount.

I think everybody understands in the business that the politics are rising. They're putting it into the business plan. But in the lesson of 2009 when the Congress came as close as it ever has to enacting --

HAYES: It passed in the House by one vote, right?

COLL: By one vote and died in the Senate in the midst of a severe recession where the jobs narrative overtook the climate narrative. But the lesson is that there are oil companies, big oil companies in the coalition that was working to pass that carbon price.

And the reason is they've got a great business. It's incredibly durable. It's incredibly profitable.

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What they want is price certainty. They want to be able to plan, and they're willing to accept a carbon price, some of them, if they have to if it's made clear that it's inevitable politically because they can still run a great business and still believe in the viability of the oil and gas business. They provide a different story in public, but in private they're planning for this price.

So the politics -- we tend to see these politics as impossible and captured by lobbyists and frozen. You know, the reality is in 2009 we as a country were that close to doing it. And --

BEINECKE: We're going to be that close again.

COLL: We have to --

HAYES: But here's the deeper question, right? Because -- and this -- I think this structures our conversation about fracking as well, which is, you know, when we look at the short term, it's reduced carbon emissions. But in the long term, if you -- if you look at this sort of Bill McKibben framework and I think estimating what total known fossil reserves in the world, it's a very difficult thing to do. That's a rough picture. Technology has come online, et cetera.

But if you're talking about -- look, all the stuff we know that's in the ground now, we can only stay a fifth out of it and stay at 2 degrees. You're talking about asking an industry, you're basically talking about dispossessing this industry of trillions of dollars of wealth.

And the politics of that are not some sort of trivial thing that people are pricing in. That's a battle. That's as much of a battle you can get in anything.

MCGINTY: It is a battle. And some of it is really not very visible at all, but really consequential to what gets to compete, right? So, renewables have this bad wrap of being, they're too expensive. We can't afford them.

Good news with technology is actually the price of producing that electron from a solar panel has really plummeted. Well, what's the difference? The difference is you have to actually build that new renewable energy plan. It's not just the cost of the electrons, it's the cost of the plan.

HAYES: Right.

MCGINTY: Now, if it's competing against the legacy coal plant, the rate payers already paid for that.

HAYES: Right, right.

MCGINTY: So the competition is really unfair. And then there are these aspects to the utility market, something called a capacity market. What's that? Well, it's a new market invented where to keep power plants online, there is an extra price we pay for plants already paid for just to keep them around. We need that from a reliability point of view.

HAYES: Right.

MCGINTY: But what if we said, OK. Capacity payment, but now we're going to have performance standards and we want clean, new generation. You want the check. Build something clean and new.

There are levers out there if we can level the playing field, the cost of electricity from renewables right now has really starting to become very competitive.

BEINECKE: It absolutely is getting competitive. And I think that's where the rules come in. We have to incentivize the newer, cleaner technologies and we have to have policies to do that, because right now, the price doesn't allow that because the natural gas price is driven so low.

So, you know, that's where we need a national energy plan. Now, you know, career -- eight presidents have called for a national energy plan. None has delivered. You know, we're hoping to get one that actually looks to the future and addresses climate change as the gravest threat facing the planet at this point.

HAYES: I'm glad you cued up the renewable conversation because that's we're going to take things next.

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Steve Coll, author of "Private Empire: ExxonMobil and American Power," and CEO of New America Foundation, CNBC contributor Dan Dicker -- thanks for joining us this morning. It was great.

The energy revolution that no one is talking about but can prove our salvation, up next.

HAYES: Along with the Bush tax cuts, the adjustments to the alternative minimum tax and payments to doctors under Medicare, there's another crucial piece of legislation set to expire. In December 31st, if Congress doesn't act, the renewable tax credit which costs us a billion dollars a year gives wind producers a tax credit that according to the industry has led to \$20 billion in private investment and the creation of 75,000 jobs.

In fact, we're in the midst of an incredible boom with wind energy. With wind energy generation increasing 600 percent between 2006 and 2011, going from supplying 18 percent of American electric generating capacity to 32 percent.

And there's solar, which according to the International Energy Agency, is the fastest growing renewable technology in the world, mainly because the price of solar panels is dropping at an astonishing rate, about 7 percent a year, pushing the price of solar power generation down 40 percent in the past year.

All of this is encouraging, but because of the costs we pay for carbon emissions aren't included in the production cost of gas and coal, the only way for wind and solar to be competitive is through subsidies like the renewable energy tax credit.

As you can see from this chart, from 2005 to 2008, continuity and the availability of the renewable tax credit has ensured steady growth in wind power. Conversely, expiration of the tax credit in '99, 2001 and 2003 wrecked havoc on the wind power industry in the years that followed.

In other words, until we start pricing carbon appropriately, the fate of clean energy lies in the hands of lawmakers which is generally a scary place to be.

Joining us now: we have Bob Freling, executive director of the Solar Electric Life Fund, Shalini Ramanathan, vice president of the Development and Renewable Energy Systems America and a leading developer of wind projects, and also a next generation project fellow at the Robert S. Strauss Center for International Security and Law at the University of Texas-Austin.

UNIDENTIFIED MALE: Wow.

HAYES: Wow. And Dave Roberts, staff writer on energy politics and policy of Grist.org is back at the table. Kate McGinty is also here.

Let's start with the subsidy issues, because I think when we talk about renewable. I mean, there's a sort of wonderful narrative that's been established. And Solyndra became this kind of iconic thing, which is like these are basically welfare cases, right? Like, we've got real energy over here and then we've got this sort of, like, I don't know, charity case. We throw some money at them, but this --

MCGINTY: I have to dive into this one --

HAYES: Yes, please?

MCGINTY: -- because the only thing that's new about the subsidies for renewables is that, in fact, over the last couple of years as your graphic showed we have had them. They're only catching up to the decades and decades and decades we have had for fossil fuels and for nuclear. In those industries they have permanent tax incentives. Renewables, by contrast, this year maybe, another year not and it leads to a plummeting in the industry and a rise in the cost.

DAVE ROBERTS, GRIST.ORG: And it's worth pointing out the explicit tax breaks that oil and gas and fossil fuels get is only a tiny sliver of the subsidy, depending on how you find subsidy. There's the unpriced carbon, of course.

HAYES: Which is the biggest, subsidy.

ROBERTS: Of course, there's all this built infrastructure designed for fossil fuels. So, it's not just --

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HAYES: What do you mean by that?

ROBERTS: Pipelines and electricity transmission lines lead to coal plants where there's the most wind and solar. You don't yet have transmission lines built there.

The point is, it's not a matter of just sort of plucking one piece of a system out and putting a new piece in. You're talking about building a whole new system, and that's -- it's very hard to sort of compare unit costs when you're talking about that. You know, you're talking about a more holistic view of things.

HAYES: Shalini?

SHALINI RAMANATHAN, VP, RENEWABLE ENERGY SYSTEMS AMERICAS: I think it's important to point out that with the wind industry we have the production tax credit, which is a credit. It's not a subsidy.

HAYES: Right.

RAMANATHAN: And it attracts an enormous level of private investment.

In fact, what we do is bring in capital from all over the world, people who want to own wind and solar projects. So, as Katie said, all energy is incentivized and subsidized if anything from the playing field and renewables are barely beginning to catch up.

Wind and solar projects, utility scale projects are infrastructure, as Dave was saying. And it takes two, three, five years sometimes to work on these projects and get them ready.

HAYES: Why is -- why is -- I want to talk to Bob and Shalini. I want to talk about why this price has come down, because it's really kind of amazing and encouraging. What's going on in wind that we've gone through this kind of wind boom?

RAMANATHAN: I think there are a couple of factors. The renewable portfolio standards in key states in California, Texas have really made a huge difference.

HAYES: Explain what those are.

RAMANATHAN: Renewable portfolio standards require utilities to procure green power.

HAYES: Right.

RAMANATHAN: So in Texas, we have blown past the RPS, that's 10,000 megawatts by 2025, and we're already there.

HAYES: So, it says to utility, it dictates and demands from the state, it's passed by the state. Of the -- you know, however much power, 100 percent of the power, right, some percentage has to come, has to, no excuses, come from renewable sources?

RAMANATHAN: That's exactly right. That's a huge driver for private investment in the industry. It's also been very important, as Katie said, to have the production tax credit, the investment tax credit for solar, especially in a plummeting gas price environment.

HAYES: Right.

RAMANATHAN: We need these incentives in order to keep building the infrastructure.

HAYES: Solar, I think, is undergoing a sort of remarkable decline in the costs of production, but it doesn't have nearly the share that wind does, right? Is that where solar is at right now?

FRELING: Let me put this in perspective, because you talk about the photovoltaic cell.

HAYES: Right.

FRELING: Convert satellite into electricity. The first commercial use of that was in 1954, Bell Labs used solar cells to

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power telephone repeater stations. At the time, it was -- it was literally astronomical in costs. And had it not been for the space race, with the Soviets, where we needed satellites in space, we needed sources of power for these satellites.

HAYES: Fascinating.

FRELING: So, NASA turned to solar cells as a source of power for the satellites. But at the time, they cost literally hundreds of dollars per watt. NASA didn't care, right?

HAYES: It's NASA.

(LAUGHTER)

FRELING: But over the last decades, the cost of solar cells has come down and down and down. The efficiency, the conversion efficiency has continued to go up and up and up, right? And now, you've got solar cells that are being produced for under a dollar a watt. Just in the last few years, they come down a factor of three, thanks mostly to the Chinese which ramped up production and made 50 percent of it.

HAYES: Hugely.

RAMANATHAN: Put some numbers around. The price of solar panels have come down 46 percent since the first quarter of 2010.

HAYES: That's crazy.

RAMANATHAN: It's incredible.

HAYES: I'm glad that you cued up the international discussion because that's -- there's a lot of exciting stuff happening internationally. And I think it's important for Americans to hear this can be done. That it doesn't have to be this sort of after thought welfare case. That actually it can actually be integrated into how a nation gets its power.

So, more on that after this break.

HAYES: In Germany, right now there's been a real revolutionary transformation of the grid there. I have some video looking at what this -- what the kind of new German energy future or present looks like. You've got times when half the power in Germany is being produced by renewables. You have a tremendous explosion of wind and solar generation.

How did this happen, Dave? How did -- how did Germany begin to undertake this?

ROBERTS: It's a really fascinating story. The German law doesn't cost -- this is what it says. It doesn't cost the government any money.

Electricity rate payers pay an extra fee to subsidize people who install solar or wind. And people who install solar and wind are guaranteed a higher than market rate of return for something like a decade. These are called feed-in tariffs in keeping with green's -- you know, aptitude for great terminology.

(LAUGHTER)

HAYES: Screw it. Tomorrow, we're doing an hour on feed-in tariffs.

ROBERTS: Yes. I had dinner with the parliamentarian in Germany that got this passed last year. I asked him, this one law is like a lever that is transforming one of the biggest industrial economies in the world. How in the world did you make this happen? You know, especially relative to the frozen politics in the U.S.

And he's like, we passed it in 2000, and everybody laughed at me. And everybody thought it was this trivial. Everybody thought, you know, it's not going to make a material difference to anything. And so, they just didn't pay attention.

The big utilities in Germany are just as opposed as --

HAYES: Sure.

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ROBERTS: As big utilities are. But they sort of snuck this thing in and it ratcheted its way up to forcing Germany to make these big systemic decisions.

HAYES: So, it's basically for the person that wants to have a wind turbine or solar panel, it's giving them the incentives and guaranteeing a sort of return.

ROBERTS: A certainty, yes.

HAYES: A certainty, right? Like I put this in -- and is that the reason? I ask myself -- I remember being in Turkey, OK? I looked -- you drive through a town of 50,000 in the middle of Turkey, in the center of Turkey, and every single water heater is solar power water heater.

And I'm just thinking of myself, why isn't that the case in California or Arizona? Like, if this is not some super sophisticated technology. This is a place that per capita GDP is way lower than the U.S. I'm not in some cosmopolitan high-tech center. I'm in the middle of a town in Turkey. And yet, there's every single water heater is solar powered.

Why isn't it not the case that we have this -- we have more deployment like that in the U.S.?

FRELING: I wish I could answer that.

(LAUGHTER)

RAMANATHAN: A couple of points there. In terms of solar hot water heating specifically, which is a simple solar technology, we actually have a lot of natural gas water heaters in this country which are very efficient. So, I think solar hot water heaters are a great idea, but I think that natural gas if you have that, if you've got a tankless water heater --

HAYES: It's already doing it fairly efficiently.

RAMANATHAN: Very efficient.

In terms of solar P.V. technology, it's growing very quickly in the U.S. And I think we touched a little bit on the fallen prices which, of course, has pushed, you know, the adoption. Another big factor are the number of different products that solar companies are offering.

You know, you asked why don't more people do it? Well, it's hard to pay for something up front that you're going to use over 25 years.

HAYES: Yes.

RAMANATHAN: But when a company like Solar City that I think is going to have a very successful IPO in the next couple of weeks, if they say you don't have to pay any more than what you're paying currently for solar. And we'll take care of everything, all you have to do is, you know, just give us the real property on your roof. I think that has --

RAMANATHAN: Many companies are doing that.

MCGINTY: That's a great example of how most of this is driven by private dollars, your dollars, my dollars, various businesses' dollars.

You know, Dave, I was thinking when you're talking about feed-in tariffs, I go, geez, is there something about solar that it needed that special price guarantee? If you look back six decades in the United States, not only were prices guaranteed for the big conventional power plants that were built, but each company got a monopoly guarantee market share.

HAYES: Right.

MCGINTY: That's how those plants got built. Today, with solar and renewables, it's mostly private dollars driving that industry.

ROBERTS: Another thing that she brings up is with the price of panel being so low now, basically being commoditized,

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it's a cheap commodity now, the differences in solar prices between installed solar in the U.S. and the installed solar in, say, Germany are what's called soft costs, which are things like acquiring customers, installing, maintenance, and financing, which is a huge, huge piece.

And the U.S. is just sort of getting in that game of soft costs. In Germany, you know, those costs are tiny relative to the U.S. So there's lots of room there to move.

FRELING: Just like to pickup on your reasoning of finance, because it is so critically when you talk about solar electricity. You know, solar panels are warranted for 25 years, right? So they're going to generate power reliably for decades to come.

And, you know, if somebody asks me to pay for three decades of electricity, you know, through my utility bill I'd have a hard time.

HAYES: Right.

FRELING: That's what you're effectively asking folks.

HAYES: When you ask them to buy.

FRELING: Financing is absolutely critical to enable users of solar systems to pay for these systems over time.

HAYES: We've talked about the U.S. and we talked about what's happening in Germany, which is a one path forward. From the climate perspective, the single most important thing is what happens in the pathway the development of those places that are not very energy intensive right now as they become energy intensive. And do they go the path way of clean and renewable energy or do they go the path way of essentially diesel burners and coal? Because if they do the latter, we're basically screwed.

And, Bob, you run an incredible nonprofit that works on electrifying places that don't have electricity with solar. I want you to talk about the work you do, because I think it's really remarkable right after this break.

HAYES: So, we're sitting here in a well-lit studio, on the grid in the wealthiest cities in the world, New York City, where we take energy for granted.

But, Bob, there are 1.5 billion people on this planet who do not have reliable access to electricity, and they should. The question is, are they going to -- how is that electrification going to happen? Tell me what your organization does?

FRELING: Sure. The Solar Electric Life Fund, SELF, is a nonprofit organization founded in 1990. So, for the last two decades we'd been bring solar electricity to rural and remote villages in the developing world, places that have never been connected to a conventional power line and aren't likely to be connected anytime in the foreseeable future.

You mentioned reliable electricity. These folks have zero electricity, right?

HAYES: Right.

FRELING: So basically what does that mean? When the sun goes down, these folks retreat into homes that are light dimly, if at all, by candles or smoky polluting kerosene lanterns, right? And children aren't able to read or study at night. They have to breathe in the kerosene fumes which are toxic, 1.5 million die every year from indoor air pollution, right?

There's basically nothing they can do to lift themselves out of poverty. They're condemned to live their lives in utter darkness. No way to pump water. No way to refrigerate vaccines. No way to deliver a baby at night. No way to communicate with the outside world, right?

So, energy poverty undermines every attempt of these people to achieve a better life for themselves. The question as you pointed out is how are these people going to emerge from centuries of darkness into a brighter future is a critical question. Are they going to rely on fossil fuels and centralized power sources?

Well, the fact is it costs up to \$20,000 a mile to extend a grid to these rural villages.

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HAYES: Wow.

FRELING: Very disperse population. So it's not economic to do so. They could fire up a diesel generator, right?

HAYES: Which is what a lot of places do do.

FRELING: Absent the grid, they turn to diesel generators. We're working with a group called Partners in Health, a well-known organization out of Boston delivering health care to the poorest of poor, initially in Haiti, later in Lesotho, Rwanda, Malawi.

HAYES: Right.

FRELING: They have been using diesel generators because they had no choice to power the hospital, right?

We turned them and said there's a better way. It will cost more up front with a solar solution, but over time, they're actually saving money, lots of money. And so, it's not just a more sustainable way to go economically. It's a smarter way.

HAYES: I want to show this -- a little bit of video about a project in West Africa, because it's not just the power and lights. It actually undergirds that whole sort of revolution in irrigation. Take a look.

(BEGIN VIDEO CLIP)

NARRATOR: Thanks to irrigation, the production has been multiplied by 10. The crops are more varied and today maize, tomatoes or even salad grow here.

UNIDENTIFIED FEMALE: I'm always in the garden. We didn't know that the sun could do all of this. Now we sell, we eat. We eat a lot here.

NARRATOR: These women can now feed their families all year-round, but also earn money and rise from poverty by selling their crops on the markets.

Commerce has appeared thanks to solar power, a first step towards development.

(END VIDEO CLIP)

HAYES: You and I met a few years ago, and you told me about this project. I just -- I feel like you should have a budget of a billion dollars.

(LAUGHTER)

HAYES: I'm serious. It does seem to me like this is -- you know, we have a -- it's such a crazy conversation about energy in this country and this world, and I know in this country, people who are extremely poor and I know a lot of folks that work among populations that are extremely poor, your energy bill is a big part of your disposable income. We're talking about cheap energy and for people who are relatively affluent, it's like this afterthought about your cable bill is eating much more than your energy bill.

But when you don't have a lot of money, energy costs are extremely important. So, there's a huge disconnect at the top of the social pyramid, at the bottom of the social pyramid both in the country and globally about how we think about energy and its price. And we can have a system that's both equitable and also sustainable.

ROBERTS: Yes. One connection I wanted to draw with this work is you're talking about bringing solar power to people in very austere conditions. But there are other people who are working in austere conditions right now, who are looking to solar and that's the U.S. military. I did a story last year on the Marines who are out in these forward bases in Afghanistan.

HAYES: Off the grid as well.

Hold that thought because we have great video of that as well and I'm going to play that and talk about what the Department of Defense is doing on this, right after this.

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(BEGIN VIDEO CLIP)

UNIDENTIFIED MALE: The experimental solar panel is designed to power a small military operation center. It's called the GREEN System, which stands for the Ground Renewable Expeditionary Energy Network System.

STAFF SGT. ANTHONY WASHINGTON, U.S. MARINE: It will generate up to 1,700 watts of pure energy into the controller system. The controller system will then take that and put it into a high energy lithium battery.

(END VIDEO CLIP)

HAYES: That's a publicity clip from the Department of Defense about the GREEN products they've been deploying.

ROBERTS: Yes. I talked to some Marines about this. Not one mentioned greenhouse gases. Every one of them loves these things because it's just purely a utility for them. It's purely an advantage for them.

And the connection I was going to make is they're working in austere conditions in the front lines in Afghanistan. If we're right about climate change, you know, post-Sandy New York is another set of austere conditions, there's going to be a lot more conditions in the world where you need portable, self-contained electricity generation.

RAMANATHAN: I think another driver for the Department of Defense, their interest in renewable energy isn't just the green. It's also concerns about cyber security. I think installations want up the ability to island systems in case of an attack they're not completely down.

HAYES: Right. And the sort of resilience question gets to the work you're doing in places that haven't had electricity, right? I said this earlier on the show. I mean, it's a remarkable thing how much you take electricity for granted and then when it goes away, you realize everything about your life is entirely dependent on it.

And so, this -- I guess my question is if you put a solar panel in a village that hasn't had electricity, what happens if six months from now it breaks or there's a problem with it? I mean, it seems like this could be a recipe for this kind of brief period, this brief renaissance and then going back and forth?

FRELING: Right. The solar panel is not likely to break, but what you need to take care of is long-term maintenance with the battery if you're using batteries to store electricity. There are some applications such as water pumping which do not require batteries. In this case, you are using the sun's energy to pump water to a reservoir and you're letting the gravity to do the rest, which is actually what we were using with the project in Benin.

If I could just --

HAYES: Yes, please.

FRELING: -- quickly, you know, elaborate a little on the project because it's pretty remarkable how far a little bit of energy goes.

In this case, we were asked to go and provide power for an entire community. And we've developed this whole village model where we use electricity for lights at home but also for the clinic, the school, for street lighting, right, for water pumping, for microenterprise and even wireless communications.

Now, in this particular village when we did a needs assessment, what became clear was their number one concern was food security, because during the six-month dry season which from November through April, there's no food production, no rain and malnutrition is widespread. So, we simply combined solar water pumps, pumping water from an underground aquifer or in some cases, a river and pumping that water to a reservoir, and then feeding a drip irrigation system, right, which is allowing these women farmers we're working with to grow high value fruits and vegetables year-round.

You go back to this village and they're well-fed. They're also earning income with the produce they're selling to the market. Suddenly, we have a model that's not only providing access to energy, but water and food and income and women's empowerment.

MCGINTY: Yes, I'm just wondering when you think about telephones, the developing world kind of leapfrogged the U.S. in terms of the poles and water to mobile.

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HAYES: Yes.

MCGINTY: Do you see the same thing potentially in energy?

FRELING: Well, it's exactly what we're doing. These folks in Africa went straight to 21st century technology -- wireless power, right? They're bypassing the distribution lines. You don't need to run these transmission lines to the villages. Wherever the sun shines, you can capture those times and generate power for just about everything you need in a sustainable carbon-free way.

ROBERTS: It's worth emphasizing if they go the other way --

HAYES: Right.

ROBERTS: -- if they go the central fossil fuel generation and big transmission line model in the developing world, we are toast.

HAYES: Right, right.

And there's also costs to even if you don't do that, the kerosene that you talked about and diesel generators and even wood stoves, which is a whole literature now about wood stoves and the environmental havoc that wood stoves are wreaking. So, there's a lot of different ways to get power that aren't necessarily this huge distributed power system that have pretty intense environmental effects.

What do we know now that we didn't know last week? My answer is after this.

HAYES: In just a moment, what we know now that we didn't know last week. But, first, a quick update on the story we've been following.

I've commented about the unfolding drama in the New York state Senate and my frustration with New York Democratic Governor Andrew Cuomo's seeming unwillingness to expend effort to help Democrats secure a majority in that body. Despite a redistricting map very favorable to Republicans, Democrats managed to win 31 seats and they are expected to win two additional recounts which would give them a majority in the 63-seat body.

But one Democrat, Simcha Felder, announced immediately after the election he'd be caucusing the Republicans. And this week comes word that the four members of the self-described independent Democratic caucus who joined the Republicans last time around will join them again along, with one new member, creating a Republican-dominated coalition majority in the state Senate despite Democrats gains at a ballot box. In a state where more than 40 percent of residents are nonwhite, this new majority coalition I should note is 90 percent white.

Governor Cuomo publishing an op-ed in the "Albany Times Union" tentatively endorsing the new majority coalition, citing previous dysfunction by the last Democratic Senate majority and laying out a litmus test for the new body of legislative priorities. Some of these ideas are questionable but some are genuinely excellent progressive ideas that urgently need to pass.

And I agree with Governor Cuomo that the issue now is outcomes and not process. Having given his blessing to the new arrangement, the governor now owns the outcomes it produces. Progressives in New York state and around the country should judge him by those outcomes. Does the state raise the minimum wage, reform New York City's stop and frisk policy, take strong action on climate, and perhaps most importantly, does it pass an ambitious public financing law for campaigns?

The governor asked voters and progressives to judge him on what his administration delivers, not how the Senate majority came to be. And we will be happy to oblige him. We'll be watching very closely.

So, what do really we know now that we didn't last week?

Thanks to a study by the World Bank, we know more clearly who will suffer most severely from the effects of climate change. It is ironically the source of much of the world's oil, northern Africa and much of the Middle East. And it is, of course, not the region's oil barons who will pay the price.

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The World Bank estimates that rising temperatures and reduced rainfall in some areas will have a devastating effect on the region's most vulnerable. Household incomes will drop 7 percent in Syria and Tunisia, 24 percent in Yemen. Malaria and malnutrition will be wild spread.

We also know now that while today's world leaders stand by and let it happen, the young people who will inherit this hostile planet are taking action. As Bill McKibben discussed on this program, his group 350.org is helping a lot of students to push their colleges to divest their endowments from fossil fuel stocks.

Unity College president Stephen Mulkey wrote a letter to college administrators saying, quote, "In the near future, the political tide will turn and the public will demand action on climate change. Our students are already demanding action and we must not ignore them."

Suzanne Welsh, V.P. of finance for Swarthmore, told "The New York Times", quote, "The endowment is not to be invested for social purposes. We already knew that investments are inextricably linked to social purposes, and now we know some institutions prefer not to see that."

And, finally, of the gases put in the air by big corporations transform our world to one more prone to weather-related disaster, we now know that other big corporations are working hard to block the changes we need to deal with the consequences.

A new report by "ProPublica" details how cell phone carriers have waged a campaign against proposal that would require them to improve cell phone service during disaster. Specifically after Katrina, industry thought up a rule that will require cell towers to keep 24 hours of backup power in reserve. The cell phone users sought areas with service in the first hours after Sandy struck, AT&T and Sprint did not release details on where their service was down.

We know the forces of the status quo and entrenched incumbent interests will have to be fought every step of the way if we want to bring about a sustainable and resilient future.

I want to find out what my guests know now they did not know at the beginning of the week.

Kate McGinty?

MCGINTY: Thanks.

Mine is a DOD piece and some good news. During the height of the election campaign, on a partisan move, the House took out dollars from DOD's budget for energy efficiency and renewable energy. The good news is post-election, it's restored. That's important.

DOD is the biggest consumer of energy. So, great market for renewables and efficiency.

Second, DOD has become a great driver of innovation and energy technology. Just like DARPA did on the Internet.

The last one is something that Dave touched on, the credibility of renewables. When you are talking security -- and DOD cares -- it brings in a whole different perspective in furtherance of renewables and efficiency.

HAYES: Yes. And, obviously, there is a tremendous amount of research dollars in the world of the Pentagon as we saw it with the development of DARPA and things like that. And a lot of times, technologies that begin at military technology, GPS is the best example, right, started as military technology and then become broadly successful in the public and cost comes down.

MCGINTY: Absolutely. And we're back on track now for good news.

HAYES: Bob?

FRELING: Last week, NASA released images from their visible infrared imaging radiometer suit. I'm now told that basically it's a satellite using high resolution, visible and infrared imaging to reveal the most detailed images of earth at night that we've ever seen.

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And, for me, that was just another reminder of the reality in which we live where you have 1.5 billion people without power. You look at Africa at night, and you see it's basically a continent shrouded in darkness. And to me, that's something we keep needing to remind ourselves.

You know, for any of your viewers that want to know what they can do to help bring light and power.

HAYES: To get to that \$1 billion budget.

FRELING: Absolutely. And hope to the poorest people in the world. I would like to welcome them to visit our Web site, which is SELF.org. A little bit goes a long way.

HAYES: For full disclosure, I always give to your organization every year. And I think it's an incredibly worthy organization to give to. And folks should definitely check that out, SELF.org.

Shalini?

RAMANATHAN: I learned that Rio Tinto, the big mining company, is using wind turbines for a diamond mine in northern Canada, and they're doing it not for any kind of environmental reasons but because it's the only reliable source of fuel there. So, I think it points out, there are many reasons to do renewables and in a lot of context, they are the best source of electricity for people.

HAYES: And is that a situation where we're talking about before where you can basically just have power generation local and not have to be hooked up to the grid or not have to extend lines out, et cetera?

RAMANATHAN: It is. And I think it's important to point out that, you know, renewables can happen a lot of different ways. You can do what Bob is doing and have solar panels on people's roofs, which is happening in the U.S. as well. Or you can have the big power projects that are big wind turbines like what my company has done and others have done, and big solar projects.

So, really, wind and solar can be either grid connected or stand-alone. It depends on the problem you are trying to solve.

HAYES: Dave?

ROBERTS: It has been taken for granted by politics watchers that at the federal level, climate politics is broken, nothing out of the federal government. But it turns out not to be true. There is a provision of the Clean Air Act that Obama can use to reduce total U.S. carbon emissions 10 percent by 2020 with the stroke of his pen without permission from Congress.

So, he's got no excuse now. And if people are looking for a place to focus their energy on trying to make something actually happen here, this is a tool that is laying on the table. And, right now, the EPA is very nervous, for obvious reasons, about using it and could use some bucking up, I think.

HAYES: The EPA is in the midst of a process internal about what rules are going to come out. They have come out with some rules and others. The Supreme Court has authorized them to regulate carbon under the Clean Air Act. So, they have that -- they have that legal authority.

And NRDC has put out this report sketching out a way they could go about doing it in a plausible fashion that wouldn't be too much.

ROBERTS: Yes. And if you are interested in the details, I wrote it up at Grist.org, which also deserves \$1 billion.

HAYES: Just throwing around billions here.

My thanks to Kathleen McGinty from the sustainable construction company WESTON Solutions, Bob Freling from the Solar Electric Life Fund, SELF.org, Shalini Ramanathan from the wind energy company RES Americas, and Dave Roberts from Grist.org. Thanks for getting up.

Thank you for joining us today for UP.

Join us tomorrow, Sunday morning at 8:00 when we'll have Dan Savage. He's getting married tomorrow. The first day it

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will be legal in Washington state.

I sat down with him last night for a bottle of champagne at this desk for an amazing talk about same-sex marriage and what it means for the gay community, Supreme Court's decision to hear a challenge to DOMA, Defense of Marriage Act -- all of that we will have for you tomorrow. I'm really excited. It was a great, great conversation with Dan.

Coming up next is "MELISSA HARRIS-PERRY". On today's "MHP", "Reefer Revolution", recreational marijuana use in Washington state is now legal. Are we seeing the beginning of the end of a misguided harmful war on drugs? That and more on "MELISSA HARRIS PERRY", coming up next.

We'll see you right here tomorrow at 8:00. Thanks for getting UP.

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# **EPA & Hydraulic Fracturing - Dec. 10**

## **The Fracking Debate; Saudi America; The Renewable Future Utility Products Magazine - Online**

**12/10/2012**

CHRIS HAYES, MSNBC ANCHOR: Good morning from New York. I'm Chris Hayes.

Egyptian newspaper, Al-Ahram, reports that President Morsi will issue a law giving judicial immunity to the military as it quells protests there. Demonstrators are marching in Cairo to protest Morsi's attempt to push through a new constitution written by his allies.

And Charlie Crist, the former Republican governor of Florida who ran for Senate as an independent in 2010, announced late Friday that he is officially joining the Democratic Party.

Right now, I'm joined by Dave Roberts, a staff writer covering energy and politics for Grist.org, Tanya Fields, an urban farmer and founder of the BLK Projek, which promotes urban agriculture and small business creation by Women of Color, Dan Dicker, author of "Oil's Endless Bid: Taming the Unreliable Price of Oil to Secure our Economy," a CNBC contributor and president of Mercbloc, an independent wealth management firm, and Uni Blake, director of environmental affairs for Hometown Energy Group, an independent energy consulting firm with clients in the oil and gas industry.

Republican senator, Rand Paul, of Kentucky on Wednesday lambasted the actress, Ashley Judd, who is reportedly considering a run for Senate there. Paul said Judd's politics were too far left for Kentucky and that her opposition to one industry in particular would doom her candidacy.

(BEGIN VIDEO CLIP)

VOICE OF RAND PAUL, (R) KENTUCKY: She's way damn too liberal for our country and for our state. She hates our biggest industry, which is coal. So, I say good luck bringing the "I hate coal" message to Kentucky.

(END VIDEO CLIP)

HAYES: But as it turns out, Paul's comments reveal a fundamental misunderstanding of his own state's economy. According to data from the Bureau of Economic Analysis, first caught by political researcher, James Carter IV (ph), mining is only the 13th largest industry in Kentucky by GDP. Manufacturing is at the top of the list.

And if you go by jobs, mining is only 15th in the state, employing only about 30,000 people. Health care is at top of that list with almost eight times the number of workers. So, Paul's claims are just flat wrong. They, nonetheless, reveal a deep anxiety and defensiveness about the coal industry, which is very much on the wane in America.

Today, coal provides only a third of the nation's power down from nearly half. Just four years ago, coal-burning power plants are shutting down across the country. There's a war on coal as you may have heard during the campaign, but the aggressors aren't bureaucrats or environmentalist.

The biggest culprit in the demise of coal is a rival energy industry, natural gas, specifically, the technology that has radically transformed natural gas production over the last years something called hydraulic fracturing or fracking. The name is incredibly opaque, but the goal is simple. Tens of thousands of feet below the surface, there are deposits of natural gas trapped within giant rock formations.

Fracking lets energy companies drill down and get those deposits by pumping a mixture of water, sand, and chemicals into the rock to release the gas. That process has fundamentally revolutionized America's energy economy in just a few years. The average annual price of natural gas is less than half what it was in 2008.

Large swaths of the United States from Colorado to Texas to Ohio to up state New York have massive natural gas reserves making them right for fracking. Residents for (INAUDIBLE) based primarily on concerns about health and the safety of the process. Those battles may well decide the course of America's energy economy over the next century.

I think there's a real mismatch between the amount of -- between the scale of the change that's happening in America

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right now because of the fracking boom and the amount of intense consternation, debate, and politics around the local level on the amount of coverage it's getting naturally. It's sort of this thing that's happening under the radar.

Natural gas, the natural gas revolution that's happening right now is -- you're someone who works in the energy sector. You're a trader in the energy sector. It's fundamentally transforming the economics --

DAN DICKER, CNBC CONTRIBUTOR: And it's new. And that's what needs to be -- you need to say that clearly. This is in its absolute infancy, fracking as -- it's been going on for one time, but deep fracking that they're doing now really only began in 2007 in Texas in the Haynesville, and it's been moved quickly into the major place.

So, we've gotten at a very strange kind of movement in the timeline of fracking. It's run almost haphazardly in three different directions from the industry, which has gone unto a land grab bonanza and a mania into a fracking without much regulation and much oversight that has started with it. Now, I'm not saying what's been done has been badly done.

Most of it has been well-done, but there's been bad examples of bad wells fracked out there. And, what it is it's going at a break neck pace now trying to capture what is what you say is a boom that's just begun.

HAYES: Dave, is there -- I mean, I guess, you know, at the top line you say, look, there's this huge, plentiful source of energy. Here's the president talking about fracking and its promise in Ohio in July.

(BEGIN VIDEO CLIP)

BARACK OBAMA, PRESIDENT OF THE UNITED STATES: Not only are we blessed with incredible natural gas resources that are now accessible because of new technologies, but natural gas actually burns cleaner than some other fossil fuels and is an ideal fuel energy source that we potentially can use for the next 100 years.

There are a lot of folks right now that are engaging in hydraulic fracking who are doing it safely. The problem is is that we haven't established clear guidelines for how to do it safely and informed the public so that neighbors know what's going on. And, you know, your family, you can make sure that any industry that's operating in your area, that they're being responsible.

(END VIDEO CLIP)

DAVE ROBERTS, GRIST.ORG: Yes. Part of the fracking being so new, like you said, especially deep fracking being so new is that there's just a lot we don't know about it. We just -- it does burn cleaner than coal in power plants. That's pretty uncontested, but if you go look at the, say, methane released by fracking and by transporting this stuff through pipeline, there's a lot of methane released, and methane is a very powerful greenhouse gas as well as CO2.

So, the balance in terms of climate change between natural gas and coal is still somewhat a question mark. It looks based on most science we have now cleaner than coal, but we just don't know. We just don't know a lot about the local impacts. We don't know how long these prices are going to stay low.

We don't know how long these wells are going to last. We really -- there's a lot we don't know about it, and it's moving so quickly. I think that's why you see a lot of this.

HAYES: There's a lot of fear.

ROBERTS: -- at the local level.

HAYES: Yes. And you're someone who is familiar with this. You live in upstate. You've consulted for the oil and gas industry and you're a toxicologist, right? What are the fears you hear, and what's your feeling about how people are understanding the process?

UNI BLAKE, HOMETOWN ENERGY GROUP: People are not understanding the process at all. The information is out there. The industry has been doing this for a while. They have the information, but the problem is a lot of people don't believe what the industry says.

HAYES: Right.

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BLAKE: So, even if the industry --

HAYES: Which is not ridiculous. Let me just say it for the record, right? I mean, like, you know, this is just as a basic kind of -- I mean, I think you're right, right? What ends up happening is there's this -- you get this debate, right? And, you know, the natural gas company says X and a group of activists say Y.

And I as a third party entering into this, I say, well, the natural gas company has, you know, hundreds of millions if not billions of dollars riding on X being the case. I'm going to view it a little skeptical.

BLAKE: I understand what you're saying, but if you want a solution to a problem, then, sometimes, you know, you have to look within. The industry has spent a lot of years doing research on a lot of these issues. All you have to do is go to, let's say, SPE. They do an annual conference, and they have a lot of information there, a lot of reports about health issues, about water issues.

But the problem is, again, nobody wants to believe what the industry is saying. And so, you have the environmentalists putting their reports out, and then you have the industry saying, well, we don't want to believe what you're saying either. And so, we're at a really bad impasse. At some point, we have to come together and decide, you know, what is and what is not.

(CROSSTALK)

TANYA FIELDS, THE BLK PROJEK: Because the people don't -- you say they don't believe what the industry is saying as if we were all inherently naturally skeptics if there's not a history that would lend to that. We have people in towns whose water is flammable, whose livestock are delivering calves and breeds that die before the year is over.

Disproportionately, two instances before there was fracking, right? This country has a long history in terms of the industry dominating and saying one thing, and people actually putting their trust that what they're saying is the truth and then turning around and ending up with billions of dollars in public health issues degradation of their environment, disinvestment of their local economic development.

And, of course, I wouldn't believe what you said. You're asking the fox to watch the henhouse, essentially. So, there is a lot of investment in telling people, you know -- what they -- not telling them anything, right? Chemicals are looked at trade secrets.

HAYES: Right.

FIELDS: So, you're put tons of chemicals into the -- potentially into the water table -- water table, and you're not telling them because it could help the competition.

DICKER: Look. There are real environmental challenges with fracking. They are real. They are measurable. We are getting a handle on these, but the idea that they are infecting water tables is a bit overwrought. We've had well over 40,000 wells fracked in this country. The EPA has found one kind of species example of some sort of water table activity in Wyoming.

Even they're not sure about that one. It seems the water table -- now, a greenhouse gas effect of loose methane, that's real. In terms of water that's coming up, recyclable water that's coming up as brine after the fracking process, that's real, in terms of (INAUDIBLE) we have to separate what --

(CROSSTALK)

HAYES: Let's do that, because I do think -- I think there's a bunch of stuff on the table, right? And the part of this, it's a complicated process, and it's a scary process in the fact that these are areas that, you know, West Texas is used to energy extraction, right? Southeast Pennsylvania is not necessarily used to it or upstate New York is not used to it, right?

So, all of a sudden, you have this industry that's coming in. So, I want to sort of step through these different risks, because I do think there are risks and I do think there's a little mix of anecdotal fear and then some real -- but there's also very grounded reason to be skeptical about a lot of the processes. So, let's sort of dive deep into that right after we take this break.

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(BEGIN VIDEO CLIP)

UNIDENTIFIED MALE: It's all settled out, but that's what our water looked like.

UNIDENTIFIED MALE: That came just out of the tap?

UNIDENTIFIED FEMALE: Out of the tap.

UNIDENTIFIED FEMALE: So, in three weeks, they contacted me by phone and said, we've tested your water. There's nothing wrong with your water.

UNIDENTIFIED MALE: With this?

UNIDENTIFIED FEMALE: With this. There's nothing wrong with the water that will be affected by the oil and gas production in your area.

UNIDENTIFIED MALE: Whoa! Jesus Christ!

(END VIDEO CLIP)

HAYES: So, that's the iconic moment from the "Gasland" documentary. And it's incredibly effecting. And I think -- Tanya, you made this point about water contamination. I think, basically, look, you're drilling down. There's the water table. You are fracturing the shale. Right now, the aquifer tends to be much, much, much, much higher up in the earth than where the actual fracking is happening.

Yes. A mile maybe, but the question of ground water contamination, I think, looms incredibly large, and I want to get your sense, Uni, of where your sense the specter of ground water contamination.

BLAKE: Well, time has said a lot of things, and a lot of it have to say is based again on misinformation. We live over shale, and this is a gas-producing shale. I have tested water in Oswego (ph) County, and 20 percent of the water that we have tested with no gas drilling occurring already has methane in it.

There've been people lighting their faucets in our area for a long, long time. Ask any of the old (INAUDIBLE) that live in the area. It's something they did as kids. It was fun.

HAYES: Right.

BLAKE: So, the methane is in the water.

HAYES: Let me say this, and this is an important footnote. I don't want to litigate "Gasland" too much, but the natural resources department of state of Colorado are going to follow-up investigation into some of the examples of the -- in three of the instances that are shown in "Gasland," and their determination was in two those instances the methane coming was this sort of natural what's called biogenic methane.

(CROSSTALK)

HAYES: No, no, but in one of them, in one of them, the Department of Natural Resources found it was due to a poorly constructed well, and a poorly constructed well with improper casing, the disposal of the wastewater which comes up by the millions of gallons and sits there in a toxic pool and has to be transported out or put somewhere, right? If you don't do any of those steps (ph) along the way properly, you can get massive contamination.

(CROSSTALK)

BLAKE: I think the definition of the word "toxic," again, a toxic pool, a toxic -- cocktail, toxicity has many -- is a combination of many different things, OK? Number one, toxicity is the length of exposure. How long are you exposed to if? Number two, toxicity is, obviously, a concentration thing.

Toxicity is also, you know, is it chronic? Is it acute? If you sit here drinking coffee, OK, are you drinking a toxic solution? Do you consider your coffee toxic?

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HAYES: I sort of do, but continue.

ROBERTS: Worth it.

(LAUGHTER)

BLAKE: Well, caffeine has an LD-50 of 190, which means that the 190 mg, two liter, (ph) half the critters will die if they given caffeine. One of the toxic chemicals has an LD-50 of 143. So, the whole point is it's all relative.

HAYES: But let me tell you something, if you went to the folks in the Marcellus Shale or upstate and said, you know what, we're actually swapping out the fracking chemicals we're using with coffee and we actually have eight million gallons of coffee sitting around, no one would be psyched about that either.

(CROSSTALK)

HAYES: I mean, that's the point is that the volume of what you're talking about is on a scale that is -- that is worrisome to people.

(CROSSTALK)

BLAKE: Can we put the word toxic out of the conversation?

FIELDS: But I don't think that we should. And let me push back a little bit, because we're talking about this as if this is the end-all be all, right? We heard President Obama say we could do this for 100 more years, but we act as there's no other alternatives, that we have deliberately ignored.

HAYES: Right.

FIELDS: And that we have not put the proper resources into actually looking at, right? We're not looking at making sure that we have a country that really is focusing on energy efficiency, looking at real clean energy that's actually renewable energy, because that doesn't make as much money as natural gas, right?

And, it also doesn't open up the same kind of economic development benefits for folks, right, when we start talking about green (ph) jobs. All like you said, it's all relative. That's a really important point.

HAYES: This --

(CROSSTALK)

HAYES: -- and I think it's also interesting, because what the fracking boom is doing to the price of natural gas. I mean, I think the idea, right, is the price comes down and that's good for consumers. Energy is cheaper. But it's having a lot of knock-on effects, that diminution (ph) of price.

ROBERTS: Yes. Let me say what I think about water before we move on --

HAYES: Yes.

ROBERTS: -- because it's a point worth making. It's true that the fracking steps (ph) is taking place well below the water table, but what you have is very slow dispersions, very low concentrations, and extended contact. And we just don't know a lot about that. There's a big question mark there.

(CROSSTALK)

HAYES: OK. But there -- no, but there are some of it -- look, some of the things we know, right? We know some of the chemicals that are in there --

(CROSSTALK)

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HAYES: here's an example of this.

BLAKE: Yes, we do.

HAYES: Some city or neighbors (ph) industry pumped a mixture of chemicals identified only as EXP (INAUDIBLE) 17311 into half-dozen oil wells in rural Karnes County, Texas in July. This is from Broloomberg. One ingredient and other identified solvent can cause damage to the kidney and liver.

The solvent and several other ingredients to the product are considered a (INAUDIBLE) by superior well services, the neighbor's subsidiary (ph). That means they're exempt from disclosure. Drilling companies in Texas claim similar exemptions about 19,000 teams this year through August. So, there are -- just as a matter of fact, there are chemicals that are being put in the ground that are not disclosed because they are --

DICKER: Part of the legislation is designed to make this transparent, by the way. I think within the next year, you will see transparency entirely in whatever cocktails they're throwing down these wells, because I don't think that they are so proprietary. And even the oil companies said they're not so proprietary that they can't keep up --

HAYES: Also, all the companies are spying on each other all the time. Who are they kidding? They all know --

BLAKE: A company could not do any work in New York State without disclosing what chemicals they're going to use. The DEC will not issue any permits, unless, the DEC knows what chemicals are in those proprietary mixtures. The same with the coffee (ph) drink, OK? It has chemicals in it. You know what they are. What you don't know is whatever the -- I mean, the different amounts of the chemical.

HAYES: What are the requirements under the DEC, because it seems to me that part of the problem also is regulation, right? I mean, there is a fear that this is being inadequately regulated or nowhere near, you know, regulated enough. And I want to talk about that and talk about the solutions here.

There are some people who think there should be a ban like there is in France. There are others who think that you can do this in the regulatory margins. Let's talk about that when we come back.

HAYES: We're talking about fracking, which is an incredibly pitch battle. It is transforming the economics of energy in the country. It's transforming many local landscapes places that used to be farms or little league fields now sporting wells. There's a rush of capital into natural gas.

I think, in 2011, I want to say five of the top ten performing stocks were associated with natural gas extraction. It's true. Look it up.

(LAUGHTER)

ROBERTS: Not the ones I own.

(LAUGHTER)

HAYES: And there's lots of fears about what its environmental effects will be, what its health effects will be, and we're trying to sort of tease through some of that, and we're talking about water contamination and my sense of the literature here is that the ground water contamination through the fracking process, itself, has been documented in extremely rare cases.

But, contamination of water because you have all this wastewater, right? I won't call it toxic. You have this wastewater that is a slurry of things that you probably will not want to opt to put in your body. And you have millions of gallons of it, and then you have to do something with it. You got to truck it out or you got to let it sit there and essentially off-cycle, I guess.

You know, what you do with that. And then, I think also, you come back to this -- we're talking in the broad sense about a risk profile and about regulation, right? You know, deep water drilling is safe, right, when done correctly. And then it's fine until it's not done correctly, right? We've all seen what that looks like when it's not done correctly.

There's a question. Let me give you a little statistic here. Active oil and gas inspectors per well in 2010 by state. This is

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the amount of active wells there are per inspector, OK? And the amount of the percentage of wells inspected. In Colorado, 63 percent of the wells were inspected, and there were nearly 3,000 wells per inspector. And in a state like Pennsylvania, 91 percent and 1,400 per inspectors.

So, even in the best states, right, New York actually is in the top there in terms of the number of wells per inspector. There is this question, this broad question about whether we believe. It gets down to this trust issue, right? If you say theoretically this can be done safely under the right conditions with the right regulation, it can be done safely, there's this basic trust question about, do we trust our political system to bring about those conditions?

ROBERTS: Yes. And you know, the story of what happens when a resource is found in a rural, remote areas among politically powerless people has played itself out many, many, many times over the past, and eventually, you have to learn from history. There's always these anecdotal complaints, there's always experts from industry saying there's nothing to worry about.

There's a flood of capital, out of state capital, and out of state workers, you know, the economic boom that is inevitably temporary. And then, once everything has moved on, you find out that these towns end up being wastelands and, you know, some of the health concerns prove out and some don't.

But right now, they're just -- you know, there's motoring through it before the science and before the regulation can catch up even close.

DICKER: One of the issues you bring up about trust and our government being able to regulate this, and you talk about, for example, deep water drilling. Now, that's federal, because that's federal water and you need federal permission. You need to follow federal regulations and other (ph), but the fracking debate is difficult because its state-run for the most part.

HAYES: Yes.

DICKER: And every state environmental agency has control over each state which is why you see, for example, a lot of discussion about the Marcellus in New York where a lot of people are up in arms and really care about the environment to a certain degree, and you don't see that much in Texas, for example, in the Eagle Ford and in the Haynesville and other areas (ph) in Texas because Texas is a more happy kind of fracking state which has a lot easier --

ROBERTS: Intense pressure on state governments to grab what economic boom they can when they can, which is a lot more difficult to resist.

DICKER: What it does is it adds to the difficulty of getting a unified sort of trust going in terms of the technology itself, because each state looks at it differently.

HAYES: My sense is your position is this can be done safely and largely is being done safely now. Obviously, there are exceptions to that, but largely (INAUDIBLE). Are there standardized rules that you would like to see as someone who does think that should be done safely, you would like to see put in place to ensure that always happens?

BLAKE: Have you reviewed the New York supplemental GIS? Two thousand pages worth of regulations. Just to kind of backtrack, there's a lot of discussions going around this table, I wanted to bring up the wastewater issue since we keep alluding to it.

The wastewater as we know, obviously, is regulated under the Clean Water Act. There's been a lot of talk about this Dick Cheney and the Halliburton loophole.

HAYES: Let me just say there's an exemption put in 2005 essentially exempting from the drilling process from a particular kind of scrutiny required by federal law in the Safe Drinking Water Act.

FIELDS: There are six other federal acts that it is exempted from.

BLAKE: Yes. That's a federal.

HAYES: Right. Yes. That's a federal exemption, right.

BLAKE: He alluded to the fact that this issue is actually regulated at the state level. And so, the state is the one that

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manages the Clean Water Act. If you go through the SGIS and you look at it --

HAYES: Explain what the SGIS is.

BLAKE: It's a Supplemental Environmental Impact Statement that New York State requires, you know, for the industry to get its permits. A part of that Clean Water Act at the state level is a program called NPDS program, which is where a wastewater discharger gets a permit. And so whatever they put out in the wastewater is monitored.

And so, if the industry supplies them with wastewater, the wastewater treatment plant is expected to clean it up to the level that meets their permit regulation. And so, that permit is under the Clean Water Act. For people to go around and say that the industry is not regulated by the Clean Water Act is kind of twisting words, because their wastewater is at the wastewater outfall.

DICKER: There are some trace chemicals and others that are not under the Clean Water Act that happen to come up inside when fracking fluids come back up out of the ground. They're in the ground naturally, and they come back up as wastewater. Some of those are not covered in terms of the route that they have to go in order to be cleaned up and then released into rivers and so forth here. Most of them are. Most of them are, but some are not.

BLAKE: The permit is the one that determines what that wastewater plant is supposed to put out.

HAYES: Right. Yes. But the collection of the information is highly non-standardized, right? I mean, you're talking about New York State, and New York State has had -- and let me just say this, the background to New York State, right, which has a relatively high level of regulatory scrutiny is precisely the presence of fracking activists, right?

It wasn't just that they magically thought, you know what, let's have really tough standards on this. No. Actually, people showed up at meetings and yelled and protested, right? And so, my point is that if you're -- often the industry will point to regulatory bars that they have to clear and say, look, we have to clear these bars.

Those regulatory bars don't come around (ph). They don't just sprout out of the ground. They come about because --

DICKER: -- states like New York --

(CROSSTALK)

HAYES: Tanya Fields, founder of the BLK Projek and Uni Blake, director of Environmental Affairs for Hometown Energy Group. That was really a great discussion. I want to continue it in the future.

David, you mentioned something about the way that fossil fuel extraction can change the political, economic facts on the ground of a place. The U.S. is on track to become energy independent. Why that's bad news after this.

HAYES: My story of the week, Saudi America. Right now, in Dickinson, North Dakota, the local McDonald's is offering up \$300 signing bonus to new employees. You heard that right, but 7.7 percent nationwide unemployment rate, persistently sluggish job growth, and wage stagnation, the labor market of this one town in North Dakota is so tight, and employers are so desperate for workers, they're offering a signing bonus for a job slinging fries.

And it's not Dickinson. Unemployment in the entire state in North Dakota is 3.1 percent. GDP growth in the state is a whopping 7.6 percent, and housing there is in such short supply (ph) that one bedrooms are renting for more than \$1,000. What economic miracle has taken place in the plains (ph), you might ask, to bring this about?

The answer is the Bakken formation, a subterranean rock formation that contains a thin, and until recently, more or less inaccessible sea of oil within relatively hard rocks. The revolution in the technology of its fraction, including fracking has helped unlock the oil in the Bakken and some speculate that the amount of extractable oil from just this one geological formation alone could surpass the reserves of all of Iraq and Kuwait combined.

Production from the area has skyrocket and this new production boom is driving a larger national trend, pushing U.S. oil production up for the first time in a generation and arresting what many believe was a permanent decline. This chart shows the comparative growth in crude oil supply among a number of non-OPEC countries.

And what you see is the U.S. obliterating the rest of the world. Employment in oil and gas extraction has surged to the

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highest level since 1992, though, we should note they still provide a tiny, tiny sliver of the country's job just under 200,000.

Our net oil imports are crashing (ph) as you see here, and now, a number of analysts are predicting that in the near future, the U.S. will be producing more oil than any other country in the world. By round 2020, a recent international energy agency report predicts the U.S. is projected to become the largest global oil producer and starts to see the impact of new fuel efficiency measures and transport.

The results in a continued fall in U.S. imports to the extent that North America becomes a net oil exporter around 2030. Yes, that's right.

The United States, which is according to the spokes fuel from the coal industry already the Saudi Arabia of coal, which is, thanks to the fracking revolution, now essentially tied with Russia as the single largest producer of natural gas in the world could also once again find itself the world's biggest oil producer on a consistent basis for the first time since the first half of the 20th century.

In energy circles, you're beginning to hear the phrase "Saudi America" used to refer to this future fossil fuel juggernaut. And you might look overall this and say fantastic. America is finally within sight of that much mythologized, long promised destination, energy independence.

Not only will we be able to cheaply supply our own power grid, vehicles, and army, we'll actually be able to make money, exploring our resources all over the world reversing the long trend towards ever widening trade imbalances. And indeed, during the campaign, this was more or less the argument President Obama made.

(BEGIN VIDEO CLIP)

OBAMA: We have increased oil production to the highest levels in 16 years. We're actually drilling more on public lands than in the previous administration. We're less dependent on foreign oil than any time in 20 years.

We're moving in the right direction in terms of energy independence.

We've built enough pipeline to wrap around the entire earth.

(END VIDEO CLIP)

HAYES: But delighting in our carbon extraction boom is staggeringly almost psychopathically perverse, because, well, it's exactly that carbon extraction that is hurling the world toward the dystrophic (ph) future, a possible four-degree Celsius global temperature rise, droughts, floods, storms, disaster, disease, death, crop failure and on and on.

In other words, you cannot separate energy policy from climate policy. There are one in the same. And based on calculations by Bill McKibben and the rest of the folks in 350.org, only one fifth of the current proven world fossil reserves which includes everything, oil, gas, everything, can be taken out of the ground and used without our planet passing the critical two-degree increase threshold.

In other words, 80 percent of the fossil fuels that we, at this very moment, know we can take out have to stay in the ground. But there's another related threat posed by the ramping up of our fossil fuel extraction, and that is as America begins to ape (ph) Saudi Arabia's productive capacity, it also begins to more closely resemble politics.

Economists have long talk about the resource curse and the fact that countries with massive, lucrative natural resource found this tend to be developmental and governance basket cases ruled over by a tactless (ph), ruthless, in trend set (ph) of extractive oligarchs (ph). And if you think that sounds foreign, go take a look at the politics in places like West Texas and West Virginia.

The promise of energy independence is a kind of liberation, but it is a false promise. If history or a look across the globe tells us anything it's that the extremely lucrative industry of extracting and selling carbon fuel offers all of the actual freedom of the devil's handshake. How we escape it after this.

HAYES: We are talking about the remarkable fossil fuel extraction boom that is happening in the United States leaving some energy analysts to refer to Saudi America as the U.S. becomes possibly the top producer in the world of oil in the

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near future. It has the largest known proven coal reserves in the entire world and is tied with Russia for the largest natural gas annual production.

Joining me at the table is Kathleen McGinty, senior vice president and managing director for strategic growth at Weston Solutions, Inc., a company which does green property renovation, Steve Coll, author of "Private Empire ExxonMobil and American Power," which is just a remarkable book, and president of the New American Foundation.

He's also a staff writer at the "New Yorker" magazine. Frances Beinecke, president of the Natural Resources Defense Council, and Dan Dicker is still at the table.

I'm really curious about how this boom is going to transform American politics. And I'm particularly concerned about climate, right? Because it seems to me that we are basically in certain ways headed in exactly the wrong direction, but also, at the same time, headed in the right direction. And here's what I mean by that.

Carbon emissions are the lowest in the country since 1992, right? And that is largely because every BTU of natural gas you substitute for BTU of coal, you basically get 50 percent of the emissions. So, at the same time, we're having this fossil fuel boom. We're also having this decline in our carbon emissions. And so, I wonder, how should I feel from an environmental perspective about these two facts that seem to be in deep tension with each other?

FRANCES BEINECKE, PRESIDENT, NRDC: I think the main thing, Chris, is that we have to get on a path way to reduce emissions over time. Natural gas is better than coal, but it does not get you there. And you have to have a clean energy plan that gets you to a cleaner solution, which includes efficiency and renewables and the cleanest burning fuels that you can get.

And basically, the natural gas boom is a temporary benefit from a climate standpoint, but a long-term disaster because it prevents the transition from happening.

KATHLEEN MCGINTY, WESTON SOLUTIONS, INC.: Yes. Chris, right now, we're in a position where because of the production of gas at such great levels, it has caused the price of that gas to come down precipitously. Now, that turns out not to be very good for the gas companies who aren't making the money that they were making.

HAYES: Right.

MCGINTY: They're shutting in some of those wells, but it also turns out not to be very good for the renewables --

HAYES: Right. Who are now have to compete with this --

MCGINTY: Exactly. And it's pretty darn hard to finance that renewable project when the price of gas has brought that price of electricity down.

HAYES: But I'm also really worried about the political economy here, because to me, this seems a big issue, right? It's like, if you're going to actually have a climate policy, you have to go through the fossil fuel companies.

MCGINTY: Right.

HAYES: And the fossil fuel companies are big and mean and tough. And they are some of the most profitable companies in the history of human civilization. And you've written entire magnum opus about one of them.

And I wonder what you think, how is this going to shape the political relationship between the state and its ability to bring to heel these companies if we have this massive expansion in the extractive capacity of the nation?

STEVE COLL, AUTHOR, "PRIVATE EMPIRE": Well, the basic problem is that while it's true that climate and energy policy are the same thing, and our politics, they're not integrated. We don't have a government. We don't have a democracy that can bring those two policy strands together, and part is the political power of the fossil fuels industry.

Between 1998 and 2012, the combined spending in Washington disclosed lobbying spending of the oil and gas industry and the electric utility industry \$3.5 billion. Pretty much top of the chart. And that means that they have a kind of blocking position in Congress. So, when -- even when you had a Democratic House in 2006 and a Democratic presidency in 2008, we couldn't get a price on carbon enacted, even a relatively modest one.

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Now, we had a recession. There were extenuating circumstances, but people understand that the politics of putting a price on carbon-heavy fuels, which is the easiest way just start to integrate climate energy policy is pretty much dead in the Congress. Even now, you don't even hear the president talking about it in the campaign where you had the opportunity to start to set that agenda.

BEINECKE: So, Chris, on that point, the fact is that the president has the authority to reduce emissions under the Clean Air Act. He can do it efficiently, he can do it cost-effectively, and I think that grassroots from all over the country are going to be demanding that action from the president and from this administration.

HAYES: In fact, the natural resources defense council just put out a wonderful report, which I recommend earlier. We'll put out on our Facebook page and our blog and our Tumblr, basically, sketching out what that will look like, how -- because the EPA has found it can regulate it under --

BEINECKE: The Supreme Court authorized the EPA to regulate it under the Clear Air Act. And our program basically promotes massive investments in efficiency to reduce emissions 26 percent by 2020 from the power sector of largest single source of emissions in this country. So, we have to get on a path to reducing our emissions. We have to use the authority we have.

As Steve says, Congress doesn't have the appetite now. Hopefully, at some point, they will, but we can't wait for them.

DICKER: I think you got to give Congress the appetite and Steve -- to make the -- put the politics into the climate and into the energy equation, and this is the way you do it. I think this president has a tremendous opportunity, one that no other president has had because of the infancy nature of both fracking of natural gas and the shale oil, as you say, in the Bakken, and what's going on deep water in the Gulf of Mexico.

This is we're at a moment in time where we're at the infancy of a great revolution, as you say, and there's a moment where you can say -- the president can say, I'm going to have a consolidated energy policy, the first of its kind in the last 50 years where if you want \$5 billion in subsidies for big oil, then you're going to have to pay for that with \$5 million of getting us further along the way towards a renewable future.

And if you don't do this, then you're not entitled to this. You have to integrate everything so you can use a hammer, the hammer of money against the big oil companies to make that move forward in the renewables that they won't do by themselves.

HAYES: Kate, I want to hear some thoughts on this right after we take a quick break.

HAYES: Kate, you have something you want to say.

MCGINTY: Well, on energy policy, I agree. It needs to be an integrated comprehensive energy policy, but here's the point. Even then as since as some gain (ph), who's producing the electrons where they coming from? I'm hoping we can expand the equation beyond that, and what am I talking about?

What about the value enhancing end uses of either oil or gas where you're using it not necessarily as an energy source primarily, but you're keeping those good jobs in the United States by using it as a feed stock for high-tech industries or pharmaceuticals or chemicals or fertilizers, that kind of thing. If you can do that, it may dial down some of the animosity between fossil fuels and renewables as it relates to electricity or transportation fuels.

HAYES: But that animosity seems to me like that animosity exists at this table but like it barely seems to exist at Capitol Hill. I mean, it's just like -- you know what I mean? It's like Goliath and then like David's puppy poodle in terms of like the size of the industries that we're talking about.

BEINECKE: That's absolutely true, but I think the other thing that's happening and it's happening on the ground across the country is they're climate victims from all the energy development that's going on. The people who's homes are being affected in Pennsylvania, the people who lost their homes in Staten Island and the Jersey shore from hurricane Sandy, the people who live along the Keystone Pipeline.

I mean, there are people across the country who are beginning to rebel against the huge fossil fuel development that is taking over their communities. I think that's the counterweight. It's going to come from the grassroots. It's going to

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demand -- it's going to end up in Washington.

COLL: I think that's the key point, because you look at the history of environmental movements in this country.

The American people, including in red states, have proved themselves willing over and over again to tax themselves to address current risks to their health, their children's health, their communities, their water supply, the air they breathe. The problem with climate to date has been -- that it has been seen as a future risk, and it's coming forward, and as it does, the politics are going to change.

HAYES: The politics also change -- you made this really interesting point during the break about geography of it changing, right? It's like well, we know -- we basically know how the senator from West Virginia are going to vote on stuff that has to do with coal. Democrat, Republican, Marxist, whatever.

I mean, whoever you would elect from West Virginia, they're going to vote a certain way on coal. And the fact that we now have this incredibly distributed development because of the fracking boom means that a lot of different places now are geographically playing and that can go two ways, right?

One way is we produce more senators from the state of West Virginia and how they vote. The other is that we produce this broad grassroots activism that actually has some political traction.

COLL: Well, the effects of a national politics, too, because look at this last election. Why was President Obama as muted as he was about climate and about oil and gas and coal production? Well, Virginia, Colorado, Ohio, Pennsylvania. These are --

DICKER: Michigan.

COLL: You know, this -- and the way our Electoral College --

(CROSSTALK)

COLL: -- we only worry about ten states that they're very invested in oil and gas production.

MCGINTY: Some of it says come back to the economics as well. I look at my own state of Pennsylvania where we had the early stages of huge boom in the Marcellus shale. Hundreds and hundreds of wells being deployed. Some companies now are down to just a couple wells. Well, why? Because that price has plummeted.

HAYES: Right.

MCGINTY: The reason why it's relevant to the politics is if this genuinely does become a boom and bust, then those politics that get really engrained when a big part of the state's economics depend on that industry, maybe that doesn't take hold. That's where I think it's interesting in terms of those end use industries, if you can see them come in, you have a different equation with that same resource.

HAYES: I want to talk about the price that has happened, because that's the background for all of this, and this is what consumers tend to care about and voters, particularly, when we talk about price of the pump and Wolf Runner (ph), the role of people filling up here on cable news.

And, my sense is that the price of energy in some ways is too low at a certain level right now, and I want to talk about that right after we take this break.

HAYES: Good morning from New York. I'm Chris Hayes here with Kathleen McGinty from Weston Solutions which does green property renovation, Steve Coll, author of "Private Empire ExxonMobil and American Power," CNBC contributor, Dan Dicker, and Frances Beinecke of the Natural Resources Defense Council. And we are talking about the massive, extractive energy boom that's happening in America right now. How it's transforming our politics? What it might do to our politics in the future and how that can be made to work with a same climate policy, which is really the difficult question.

And I -- before the break, I left the question on the table about the price of energy being too low right now, that basically what we've seen is this massive amount of supply has come onto the grid, thanks largely to natural gas. The price has come down. And, I think we generally think, oh, lower prices are better.

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But, it seems to me that there's a lot of problematic stuff about the price coming down as sharply as it is right now in terms of what incentives it provides for things like efficiency et cetera.

DICKER: Yes, you would want the prices to go up a lot because it would drive the next stage towards renewables and would make that at least cost-effective. Algae fuel, for example, we talk a lot about that. But --

HAYES: Some people talk a lot about that.

(CROSSTALK)

DICKER: The cost is about \$8.50 to \$9 a gallon, compared to gasoline as it is now.

So, you want the prices to go up to make this a little more cost-effective to drive the technology into them.

Unfortunately, it's actually going quite the opposite. You talk about increased supply here in the United States. In fact, overseas demand is dropping. We are still in the midst of an economic problem in Europe. Chinese growth is going down. Indian growth seems to be going down.

In this country, we've certainly done better in terms of the efficiencies and our demands are starting to drop. So, in terms of what economically you can expect, you will expect the opposite -- or at least I do -- over the next several years that oil prices will in fact go lower, natural gas, in fact, you can -- you know, because we have a futures market, we look forward to the future and see what people are betting the price is going to be. That doesn't go over \$5/Mcf until 2020 according to the futures markets.

So, although you might want -- we have to drive the renewable argument some other way, because price doesn't look like it's going to do it.

BEINECKE: The only thing to change that is if we put a price on carbon.

HAYES: Right. That's the big --

BEINECKE: The fact is that externalities of all the fossil fuel development are not incorporated in the current price, so the environmental effects, the health effects, the consequences to communities, none of that is factored in. We have to change that and get a price on carbon, drive it up so that we can promote renewables and efficiencies first and foremost.

HAYES: And part of what's so strong about the politics of all of this to me, and I always -- it always strikes me, you know, gas prices go up and then gas prices will briefly dominate the campaign and then, they'll go down. And no one is saying -- it's like completely asymmetrical, right?

If gas prices go up, it's a problem. If they go down, no one is like -- hey, awesome, gas prices went down, I'm doing a victory lap, right? It goes up and it's a problem.

And then, more broadly, when something like Sandy happens, right?

UNIDENTIFIED FEMALE: Right.

HAYES: It's really fascinating to think about this. You know, you lose power, OK? My parents in the Bronx lost power and other people lost it for days.

And all of a sudden, you're like, oh, right. Everything about my life literally every last detail is dependent on this massive invisible infrastructure. I never think about it that a whole bunch of people are running and litigating about and legislating and regulating and making a lot of money off this massive industry that is just like huge mountain I sit at the very top of it, and I live my life.

And then when it goes away, what's the deal? Like how does my utility company actually work, and why can't they get my parents' power restored in a week?

And I think one of the things that's been positive about the fracking boom is it produced this grassroots response in which

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people are educating themselves about the chain of production of how does a molecule of carbon go from the ground to firing up your grid so you can turn your light on.

MCGINTY: Sandy, too. One of the other things that became very visible with the mile after mile of these poles and wires that are down --

HAYES: Right.

MCGINTY: -- it hit you in the face, that is this what we're running the greatest superpower on Earth? Is poles and wires that get blown down? Is that the way to power a 21st century economy?

I think that could be one of the forces that becomes a bit of a counterbalance to the economics, so that the economics are the toughest one.

HAYES: But the problem is it's so opaque, right? I mean, in the case -- this is why I think the politics get so tricky. It's like I don't -- like what is my utility company? As a citizen, I don't know. He they send me a bill, but like, if you ask how many people work for it or like what degree it's public and private, like all of this is just remarkably shrouded in complexity.

COLL: It is utility regulation that's one area in our economy, where your right to be heard and have public interest in is embedded into the regulatory system, unlike the oil industry and gasoline provision which, as a practical matter, is also a utility function. It isn't regulated in the public interest.

You know, just to come back to this price discussion here --

HAYES: Yes.

COLL: -- the history of oil and gas prices, the history of commodity prices in general is that they fluctuate. They go up and down. And on the base of price signals, people shut down wells when prices are too low, supply contracts, prices go up, people boom.

HAYES: It's a classic boom/bust thing.

COLL: You can't build pub policy on the basis of extrapolating commodity prices from the present.

HAYES: Yes.

COLL: And so, to go back to the idea that we need a carbon price, which we do, the implications is that politically you ought to enact it when prices are low --

HAYES: Right.

COLL: -- so that you do relatively little damage to the economy.

HAYES: Right, right, right.

BEINECKE: Now is the time. That's a great thing, Steve. We should be doing it right now.

COLL: Right.

BEINECKE: And everyone knows it's coming. That's the other thing. I mean, it's not as though --

HAYES: Do they?

DICKER: I don't think so.

(LAUGHTER)

BEINECKE: You're saying that the utility companies, the coal companies, the fossil fuel industry, this is something they're examining every day. Everyone is looking at what the emissions rate around the world is, the fact that the earth is

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warming very, very quickly. The arctic is melting in front of our eyes. The city of New York was closed down from a massive storm.

I mean, this is very much present. As Steve said we used to say it's a problem of the future. It's a problem of now, and we have to build the politics to get that result.

DICKER: There's a massive link between flooding in the Brooklyn Battery Tunnel and a carbon tax coming to be, a massive link.

BEINECKE: I think people are awakening to the impact.

COLL: Even ExxonMobil, their corporate planning department, assumes a price on carbon is coming. It's a question of timing and amount.

I think everybody understands in the business that the politics are rising. They're putting it into the business plan. But in the lesson of 2009 when the Congress came as close as it ever has to enacting --

HAYES: It passed in the House by one vote, right?

COLL: By one vote and died in the Senate in the midst of a severe recession where the jobs narrative overtook the climate narrative. But the lesson is that there are oil companies, big oil companies in the coalition that was working to pass that carbon price.

And the reason is they've got a great business. It's incredibly durable. It's incredibly profitable.

What they want is price certainty. They want to be able to plan, and they're willing to accept a carbon price, some of them, if they have to if it's made clear that it's inevitable politically because they can still run a great business and still believe in the viability of the oil and gas business. They provide a different story in public, but in private they're planning for this price.

So the politics -- we tend to see these politics as impossible and captured by lobbyists and frozen. You know, the reality is in 2009 we as a country were that close to doing it. And --

BEINECKE: We're going to be that close again.

COLL: We have to --

HAYES: But here's the deeper question, right? Because -- and this -- I think this structures our conversation about fracking as well, which is, you know, when we look at the short term, it's reduced carbon emissions. But in the long term, if you -- if you look at this sort of Bill McKibben framework and I think estimating what total known fossil reserves in the world, it's a very difficult thing to do. That's a rough picture. Technology has come online, et cetera.

But if you're talking about -- look, all the stuff we know that's in the ground now, we can only stay a fifth out of it and stay at 2 degrees. You're talking about asking an industry, you're basically talking about dispossessing this industry of trillions of dollars of wealth.

And the politics of that are not some sort of trivial thing that people are pricing in. That's a battle. That's as much of a battle you can get in anything.

MCGINTY: It is a battle. And some of it is really not very visible at all, but really consequential to what gets to compete, right? So, renewables have this bad wrap of being, they're too expensive. We can't afford them.

Good news with technology is actually the price of producing that electron from a solar panel has really plummeted. Well, what's the difference? The difference is you have to actually build that new renewable energy plan. It's not just the cost of the electrons, it's the cost of the plan.

HAYES: Right.

MCGINTY: Now, if it's competing against the legacy coal plant, the rate payers already paid for that.

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HAYES: Right, right.

MCGINTY: So the competition is really unfair. And then there are these aspects to the utility market, something called a capacity market. What's that? Well, it's a new market invented where to keep power plants online, there is an extra price we pay for plants already paid for just to keep them around. We need that from a reliability point of view.

HAYES: Right.

MCGINTY: But what if we said, OK. Capacity payment, but now we're going to have performance standards and we want clean, new generation. You want the check. Build something clean and new.

There are levers out there if we can level the playing field, the cost of electricity from renewables right now has really starting to become very competitive.

BEINECKE: It absolutely is getting competitive. And I think that's where the rules come in. We have to incentivize the newer, cleaner technologies and we have to have policies to do that, because right now, the price doesn't allow that because the natural gas price is driven so low.

So, you know, that's where we need a national energy plan. Now, you know, career -- eight presidents have called for a national energy plan. None has delivered. You know, we're hoping to get one that actually looks to the future and addresses climate change as the gravest threat facing the planet at this point.

HAYES: I'm glad you cued up the renewable conversation because that's we're going to take things next.

Steve Coll, author of "Private Empire: ExxonMobil and American Power," and CEO of New America Foundation, CNBC contributor Dan Dicker -- thanks for joining us this morning. It was great.

The energy revolution that no one is talking about but can prove our salvation, up next.

HAYES: Along with the Bush tax cuts, the adjustments to the alternative minimum tax end payments to doctors under Medicare, there's another crucial piece of legislation set to expire. In December 31st, if Congress doesn't act, the renewable tax credit which costs us a billion dollars a year gives wind producers a tax credit that according to the industry has led to \$20 billion in private investment and the creation of 75,000 jobs.

In fact, we're in the midst of an incredible boom with wind energy. With wind energy generation increasing 600 percent between 2006 and 2011, going from supplying 18 percent of American electric generating capacity to 32 percent.

And there's solar, which according to the International Energy Agency, is the fastest growing renewable technology in the world, mainly because the price of solar panels is dropping at an astonishing rate, about 7 percent a year, pushing the price of solar power generation down 40 percent in the past year.

All of this is encouraging, but because of the costs we pay for carbon emissions aren't included in the production cost of gas and coal, the only way for wind and solar to be competitive is through subsidies like the renewable energy tax credit.

As you can see from this chart, from 2005 to 2008, continuity and the availability of the renewable tax credit has ensured steady growth in wind power. Conversely, expiration of the tax credit in '99, 2001 and 2003 wrecked havoc on the wind power industry in the years that followed.

In other words, until we start pricing carbon appropriately, the fate of clean energy lies in the hands of lawmakers which is generally a scary place to be.

Joining us now: we have Bob Freling, executive director of the Solar Electric Life Fund, Shalini Ramanathan, vice president of the Development and Renewable Energy Systems America and a leading developer of wind projects, and also a next generation project fellow at the Robert S. Strauss Center for International Security and Law at the University of Texas-Austin.

UNIDENTIFIED MALE: Wow.

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HAYES: Wow. And Dave Roberts, staff writer on energy politics and policy of Grist.org is back at the table. Kate McGinty is also here.

Let's start with the subsidy issues, because I think when we talk about renewable. I mean, there's a sort of wonderful narrative that's been established. And Solyndra became this kind of iconic thing, which is like these are basically welfare cases, right? Like, we've got real energy over here and then we've got this sort of, like, I don't know, charity case. We throw some money at them, but this --

MCGINTY: I have to dive into this one --

HAYES: Yes, please?

MCGINTY: -- because the only thing that's new about the subsidies for renewables is that, in fact, over the last couple of years as your graphic showed we have had them. They're only catching up to the decades and decades and decades we have had for fossil fuels and for nuclear. In those industries they have permanent tax incentives. Renewables, by contrast, this year maybe, another year not and it leads to a plummeting in the industry and a rise in the cost.

DAVE ROBERTS, GRIST.ORG: And it's worth pointing out the explicit tax breaks that oil and gas and fossil fuels get is only a tiny sliver of the subsidy, depending on how you find subsidy. There's the unpriced carbon, of course.

HAYES: Which is the biggest, subsidy.

ROBERTS: Of course, there's all this built infrastructure designed for fossil fuels. So, it's not just --

HAYES: What do you mean by that?

ROBERTS: Pipelines and electricity transmission lines lead to coal plants where there's the most wind and solar. You don't yet have transmission lines built there.

The point is, it's not a matter of just sort of plucking one piece of a system out and putting a new piece in. You're talking about building a whole new system, and that's -- it's very hard to sort of compare unit costs when you're talking about that. You know, you're talking about a more holistic view of things.

HAYES: Shalini?

SHALINI RAMANATHAN, VP, RENEWABLE ENERGY SYSTEMS AMERICAS: I think it's important to point out that with the wind industry we have the production tax credit, which is a credit. It's not a subsidy.

HAYES: Right.

RAMANATHAN: And it attracts an enormous level of private investment.

In fact, what we do is bring in capital from all over the world, people who want to own wind and solar projects. So, as Katie said, all energy is incentivized and subsidized if anything from the playing field and renewables are barely beginning to catch up.

Wind and solar projects, utility scale projects are infrastructure, as Dave was saying. And it takes two, three, five years sometimes to work on these projects and get them ready.

HAYES: Why is -- why is -- I want to talk to Bob and Shalini. I want to talk about why this price has come down, because it's really kind of amazing and encouraging. What's going on in wind that we've gone through this kind of wind boom?

RAMANATHAN: I think there are a couple of factors. The renewable portfolio standards in key states in California, Texas have really made a huge difference.

HAYES: Explain what those are.

RAMANATHAN: Renewable portfolio standards require utilities to procure green power.

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HAYES: Right.

RAMANATHAN: So in Texas, we have blown past the RPS, that's 10,000 megawatts by 2025, and we're already there.

HAYES: So, it says to utility, it dictates and demands from the state, it's passed by the state. Of the -- you know, however much power, 100 percent of the power, right, some percentage has to come, has to, no excuses, come from renewable sources?

RAMANATHAN: That's exactly right. That's a huge driver for private investment in the industry. It's also been very important, as Katie said, to have the production tax credit, the investment tax credit for solar, especially in a plummeting gas price environment.

HAYES: Right.

RAMANATHAN: We need these incentives in order to keep building the infrastructure.

HAYES: Solar, I think, is undergoing a sort of remarkable decline in the costs of production, but it doesn't have nearly the share that wind does, right? Is that where solar is at right now?

FRELING: Let me put this in perspective, because you talk about the photovoltaic cell.

HAYES: Right.

FRELING: Convert satellite into electricity. The first commercial use of that was in 1954, Bell Labs used solar cells to power telephone repeater stations. At the time, it was -- it was literally astronomical in costs. And had it not been for the space race, with the Soviets, where we needed satellites in space, we needed sources of power for these satellites.

HAYES: Fascinating.

FRELING: So, NASA turned to solar cells as a source of power for the satellites. But at the time, they cost literally hundreds of dollars per watt. NASA didn't care, right?

HAYES: It's NASA.

(LAUGHTER)

FRELING: But over the last decades, the cost of solar cells has come down and down and down. The efficiency, the conversion efficiency has continued to go up and up and up, right? And now, you've got solar cells that are being produced for under a dollar a watt. Just in the last few years, they come down a factor of three, thanks mostly to the Chinese which ramped up production and made 50 percent of it.

HAYES: Hugely.

(CROSSTALK)

RAMANATHAN: Put some numbers around. The price of solar panels have come down 46 percent since the first quarter of 2010.

HAYES: That's crazy.

RAMANATHAN: It's incredible.

HAYES: I'm glad that you cued up the international discussion because that's -- there's a lot of exciting stuff happening internationally. And I think it's important for Americans to hear this can be done. That it doesn't have to be this sort of after thought welfare case. That actually it can actually be integrated into how a nation gets its power.

So, more on that after this break.

HAYES: In Germany, right now there's been a real revolutionary transformation of the grid there. I have some video

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looking at what this -- what the kind of new German energy future or present looks like. You've got times when half the power in Germany is being produced by renewables. You have a tremendous explosion of wind and solar generation.

How did this happen, Dave? How did -- how did Germany begin to undertake this?

ROBERTS: It's a really fascinating story. The German law doesn't cost -- this is what it says. It doesn't cost the government any money.

Electricity rate payers pay an extra fee to subsidize people who install solar or wind. And people who install solar and wind are guaranteed a higher than market rate of return for something like a decade. These are called feed-in tariffs in keeping with green's -- you know, aptitude for great terminology.

(LAUGHTER)

HAYES: Screw it. Tomorrow, we're doing an hour on feed-in tariffs.

ROBERTS: Yes. I had dinner with the parliamentarian in Germany that got this passed last year. I asked him, this one law is like a lever that is transforming one of the biggest industrial economies in the world. How in the world did you make this happen? You know, especially relative to the frozen politics in the U.S.

And he's like, we passed it in 2000, and everybody laughed at me. And everybody thought it was this trivial. Everybody thought, you know, it's not going to make a material difference to anything. And so, they just didn't pay attention.

The big utilities in Germany are just as opposed as --

HAYES: Sure.

ROBERTS: As big utilities are. But they sort of snuck this thing in and it ratcheted its way up to forcing Germany to make these big systemic decisions.

HAYES: So, it's basically for the person that wants to have a wind turbine or solar panel, it's giving them the incentives and guaranteeing a sort of return.

ROBERTS: A certainty, yes.

HAYES: A certainty, right? Like I put this in -- and is that the reason? I ask myself -- I remember being in Turkey, OK? I looked -- you drive through a town of 50,000 in the middle of Turkey, in the center of Turkey, and every single water heater is solar power water heater.

And I'm just thinking of myself, why isn't that the case in California or Arizona? Like, if this is not some super sophisticated technology. This is a place that per capita GDP is way lower than the U.S. I'm not in some cosmopolitan high-tech center. I'm in the middle of a town in Turkey. And yet, there's every single water heater is solar powered.

Why isn't it not the case that we have this -- we have more deployment like that in the U.S.?

FRELING: I wish I could answer that.

(LAUGHTER)

RAMANATHAN: A couple of points there. In terms of solar hot water heating specifically, which is a simple solar technology, we actually have a lot of natural gas water heaters in this country which are very efficient. So, I think solar hot water heaters are a great idea, but I think that natural gas if you have that, if you've got a tankless water heater --

HAYES: It's already doing it fairly efficiently.

RAMANATHAN: Very efficient.

In terms of solar P.V. technology, it's growing very quickly in the U.S. And I think we touched a little bit on the fallen prices which, of course, has pushed, you know, the adoption. Another big factor are the number of different products that solar

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companies are offering.

You know, you asked why don't more people do it? Well, it's hard to pay for something up front that you're going to use over 25 years.

HAYES: Yes.

RAMANATHAN: But when a company like Solar City that I think is going to have a very successful IPO in the next couple of weeks, if they say you don't have to pay any more than what you're paying currently for solar. And we'll take care of everything, all you have to do is, you know, just give us the real property on your roof. I think that has --

(CROSSTALK)

RAMANATHAN: Many companies are doing that.

MCGINTY: That's a great example of how most of this is driven by private dollars, your dollars, my dollars, various businesses' dollars.

You know, Dave, I was thinking when you're talking about feed-in tariffs, I go, geez, is there something about solar that it needed that special price guarantee? If you look back six decades in the United States, not only were prices guaranteed for the big conventional power plants that were built, but each company got a monopoly guarantee market share.

HAYES: Right.

MCGINTY: That's how those plants got built. Today, with solar and renewables, it's mostly private dollars driving that industry.

ROBERTS: Another thing that she brings up is with the price of panel being so low now, basically being commoditized, it's a cheap commodity now, the differences in solar prices between installed solar in the U.S. and the installed solar in, say, Germany are what's called soft costs, which are things like acquiring customers, installing, maintenance, and financing, which is a huge, huge piece.

And the U.S. is just sort of getting in that game of soft costs. In Germany, you know, those costs are tiny relative to the U.S. So there's lots of room there to move.

FRELING: Just like to pickup on your reasoning of finance, because it is so critically when you talk about solar electricity. You know, solar panels are warranted for 25 years, right? So they're going to generate power reliably for decades to come.

And, you know, if somebody asks me to pay for three decades of electricity, you know, through my utility bill I'd have a hard time.

HAYES: Right.

FRELING: That's what you're effectively asking folks.

HAYES: When you ask them to buy.

FRELING: Financing is absolutely critical to enable users of solar systems to pay for these systems over time.

HAYES: We've talked about the U.S. and we talked about what's happening in Germany, which is a one path forward. From the climate perspective, the single most important thing is what happens in the pathway the development of those places that are not very energy intensive right now as they become energy intensive. And do they go the path way of clean and renewable energy or do they go the path way of essentially diesel burners and coal? Because if they do the latter, we're basically screwed.

And, Bob, you run an incredible nonprofit that works on electrifying places that don't have electricity with solar. I want you to talk about the work you do, because I think it's really remarkable right after this break.

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HAYES: So, we're sitting here in a well-lit studio, on the grid in the wealthiest cities in the world, New York City, where we take energy for granted.

But, Bob, there are 1.5 billion people on this planet who do not have reliable access to electricity, and they should. The question is, are they going to -- how is that electrification going to happen? Tell me what your organization does?

FRELING: Sure. The Solar Electric Life Fund, SELF, is a nonprofit organization founded in 1990. So, for the last two decades we'd been bring solar electricity to rural and remote villages in the developing world, places that have never been connected to a conventional power line and aren't likely to be connected anytime in the foreseeable future.

You mentioned reliable electricity. These folks have zero electricity, right?

HAYES: Right.

FRELING: So basically what does that mean? When the sun goes down, these folks retreat into homes that are light dimly, if at all, by candles or smoky polluting kerosene lanterns, right? And children aren't able to read or study at night. They have to breathe in the kerosene fumes which are toxic, 1.5 million die every year from indoor air pollution, right?

There's basically nothing they can do to lift themselves out of poverty. They're condemned to live their lives in utter darkness. No way to pump water. No way to refrigerate vaccines. No way to deliver a baby at night. No way to communicate with the outside world, right?

So, energy poverty undermines every attempt of these people to achieve a better life for themselves. The question as you pointed out is how are these people going to emerge from centuries of darkness into a brighter future is a critical question. Are they going to rely on fossil fuels and centralized power sources?

Well, the fact is it costs up to \$20,000 a mile to extend a grid to these rural villages.

HAYES: Wow.

FRELING: Very disperse population. So it's not economic to do so. They could fire up a diesel generator, right?

HAYES: Which is what a lot of places do do.

FRELING: Absent the grid, they turn to diesel generators. We're working with a group called Partners in Health, a well-known organization out of Boston delivering health care to the poorest of poor, initially in Haiti, later in Lesotho, Rwanda, Malawi.

HAYES: Right.

FRELING: They have been using diesel generators because they had no choice to power the hospital, right?

We turned them and said there's a better way. It will cost more up front with a solar solution, but over time, they're actually saving money, lots of money. And so, it's not just a more sustainable way to go economically. It's a smarter way.

HAYES: I want to show this -- a little bit of video about a project in West Africa, because it's not just the power and lights. It actually undergirds that whole sort of revolution in irrigation. Take a look.

(BEGIN VIDEO CLIP)

NARRATOR: Thanks to irrigation, the production has been multiplied by 10. The crops are more varied and today maize, tomatoes or even salad grow here.

UNIDENTIFIED FEMALE: I'm always in the garden. We didn't know that the sun could do all of this. Now we sell, we eat. We eat a lot here.

NARRATOR: These women can now feed their families all year-round, but also earn money and rise from poverty by selling their crops on the markets.

## **EPA & Hydraulic Fracturing - Dec. 10**

Commerce has appeared thanks to solar power, a first step towards development.

(END VIDEO CLIP)

HAYES: You and I met a few years ago, and you told me about this project. I just -- I feel like you should have a budget of a billion dollars.

(LAUGHTER)

HAYES: I'm serious. It does seem to me like this is -- you know, we have a -- it's such a crazy conversation about energy in this country and this world, and I know in this country, people who are extremely poor and I know a lot of folks that work among populations that are extremely poor, your energy bill is a big part of your disposable income. We're talking about cheap energy and for people who are relatively affluent, it's like this afterthought about your cable bill is eating much more than your energy bill.

But when you don't have a lot of money, energy costs are extremely important. So, there's a huge disconnect at the top of the social pyramid, at the bottom of the social pyramid both in the country and globally about how we think about energy and its price. And we can have a system that's both equitable and also sustainable.

ROBERTS: Yes. One connection I wanted to draw with this work is you're talking about bringing solar power to people in very austere conditions. But there are other people who are working in austere conditions right now, who are looking to solar and that's the U.S. military. I did a story last year on the Marines who are out in these forward bases in Afghanistan.

HAYES: Off the grid as well.

Hold that thought because we have great video of that as well and I'm going to play that and talk about what the Department of Defense is doing on this, right after this.

(BEGIN VIDEO CLIP)

UNIDENTIFIED MALE: The experimental solar panel is designed to power a small military operation center. It's called the GREEN System, which stands for the Ground Renewable Expeditionary Energy Network System.

STAFF SGT. ANTHONY WASHINGTON, U.S. MARINE: It will generate up to 1,700 watts of pure energy into the controller system. The controller system will then take that and put it into a high energy lithium battery.

(END VIDEO CLIP)

HAYES: That's a publicity clip from the Department of Defense about the GREEN products they've been deploying.

ROBERTS: Yes. I talked to some Marines about this. Not one mentioned greenhouse gases. Every one of them loves these things because it's just purely a utility for them. It's purely an advantage for them.

And the connection I was going to make is they're working in austere conditions in the front lines in Afghanistan. If we're right about climate change, you know, post-Sandy New York is another set of austere conditions, there's going to be a lot more conditions in the world where you need portable, self-contained electricity generation.

RAMANATHAN: I think another driver for the Department of Defense, their interest in renewable energy isn't just the green. It's also concerns about cyber security. I think installations want up the ability to island systems in case of an attack they're not completely down.

HAYES: Right. And the sort of resilience question gets to the work you're doing in places that haven't had electricity, right? I said this earlier on the show. I mean, it's a remarkable thing how much you take electricity for granted and then when it goes away, you realize everything about your life is entirely dependent on it.

And so, this -- I guess my question is if you put a solar panel in a village that hasn't had electricity, what happens if six months from now it breaks or there's a problem with it? I mean, it seems like this could be a recipe for this kind of brief period, this brief renaissance and then going back and forth?

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FRELING: Right. The solar panel is not likely to break, but what you need to take care of is long-term maintenance with the battery if you're using batteries to store electricity. There are some applications such as water pumping which do not require batteries. In this case, you are using the sun's energy to pump water to a reservoir and you're letting the gravity to do the rest, which is actually what we were using with the project in Benin.

If I could just --

HAYES: Yes, please.

FRELING: -- quickly, you know, elaborate a little on the project because it's pretty remarkable how far a little bit of energy goes.

In this case, we were asked to go and provide power for an entire community. And we've developed this whole village model where we use electricity for lights at home but also for the clinic, the school, for street lighting, right, for water pumping, for microenterprise and even wireless communications.

Now, in this particular village when we did a needs assessment, what became clear was their number one concern was food security, because during the six-month dry season which from November through April, there's no food production, no rain and malnutrition is widespread. So, we simply combined solar water pumps, pumping water from an underground aquifer or in some cases, a river and pumping that water to a reservoir, and then feeding a drip irrigation system, right, which is allowing these women farmers we're working with to grow high value fruits and vegetables year-round.

You go back to this village and they're well-fed. They're also earning income with the produce they're selling to the market. Suddenly, we have a model that's not only providing access to energy, but water and food and income and women's empowerment.

MCGINTY: Yes, I'm just wondering when you think about telephones, the developing world kind of leapfrogged the U.S. in terms of the poles and water to mobile.

HAYES: Yes.

MCGINTY: Do you see the same thing potentially in energy?

FRELING: Well, it's exactly what we're doing. These folks in Africa went straight to 21st century technology -- wireless power, right? They're bypassing the distribution lines. You don't need to run these transmission lines to the villages. Wherever the sun shines, you can capture those times and generate power for just about everything you need in a sustainable carbon-free way.

ROBERTS: It's worth emphasizing if they go the other way --

HAYES: Right.

ROBERTS: -- if they go the central fossil fuel generation and big transmission line model in the developing world, we are toast.

HAYES: Right, right.

And there's also costs to even if you don't do that, the kerosene that you talked about and diesel generators and even wood stoves, which is a whole literature now about wood stoves and the environmental havoc that wood stoves are wreaking. So, there's a lot of different ways to get power that aren't necessarily this huge distributed power system that have pretty intense environmental effects.

What do we know now that we didn't know last week? My answer is after this.

HAYES: In just a moment, what we know now that we didn't know last week. But, first, a quick update on the story we've been following.

I've commented about the unfolding drama in the New York state Senate and my frustration with New York Democratic Governor Andrew Cuomo's seeming unwillingness to expend effort to help Democrats secure a majority in that body.

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Despite a redistricting map very favorable to Republicans, Democrats managed to win 31 seats and they are expected to win two additional recounts which would give them a majority in the 63-seat body.

But one Democrat, Simcha Felder, announced immediately after the election he'd be caucusing the Republicans. And this week comes word that the four members of the self-described independent Democratic caucus who joined the Republicans last time around will join them again along, with one new member, creating a Republican-dominated coalition majority in the state Senate despite Democrats gains at a ballot box. In a state where more than 40 percent of residents are nonwhite, this new majority coalition I should note is 90 percent white.

Governor Cuomo publishing an op-ed in the "Albany Times Union" tentatively endorsing the new majority coalition, citing previous dysfunction by the last Democratic Senate majority and laying out a litmus test for the new body of legislative priorities. Some of these ideas are questionable but some are genuinely excellent progressive ideas that urgently need to pass.

And I agree with Governor Cuomo that the issue now is outcomes and not process. Having given his blessing to the new arrangement, the governor now owns the outcomes it produces. Progressives in New York state and around the country should judge him by those outcomes. Does the state raise the minimum wage, reform New York City's stop and frisk policy, take strong action on climate, and perhaps most importantly, does it pass an ambitious public financing law for campaigns?

The governor asked voters and progressives to judge him on what his administration delivers, not how the Senate majority came to be. And we will be happy to oblige him. We'll be watching very closely.

So, what do really we know now that we didn't last week?

Thanks to a study by the World Bank, we know more clearly who will suffer most severely from the effects of climate change. It is ironically the source of much of the world's oil, northern Africa and much of the Middle East. And it is, of course, not the region's oil barons who will pay the price.

The World Bank estimates that rising temperatures and reduced rainfall in some areas will have a devastating effect on the region's most vulnerable. Household incomes will drop 7 percent in Syria and Tunisia, 24 percent in Yemen. Malaria and malnutrition will be wild spread.

We also know now that while today's world leaders stand by and let it happen, the young people who will inherit this hostile planet are taking action. As Bill McKibben discussed on this program, his group 350.org is helping a lot of students to push their colleges to divest their endowments from fossil fuel stocks.

Unity College president Stephen Mulkey wrote a letter to college administrators saying, quote, "In the near future, the political tide will turn and the public will demand action on climate change. Our students are already demanding action and we must not ignore them."

Suzanne Welsh, V.P. of finance for Swarthmore, told "The New York Times", quote, "The endowment is not to be invested for social purposes. We already knew that investments are inextricably linked to social purposes, and now we know some institutions prefer not to see that."

And, finally, of the gases put in the air by big corporations transform our world to one more prone to weather-related disaster, we now know that other big corporations are working hard to block the changes we need to deal with the consequences.

A new report by "ProPublica" details how cell phone carriers have waged a campaign against proposal that would require them to improve cell phone service during disaster. Specifically after Katrina, industry thought up a rule that will require cell towers to keep 24 hours of backup power in reserve. The cell phone users sought areas with service in the first hours after Sandy struck, AT&T and Sprint did not release details on where their service was down.

We know the forces of the status quo and entrenched incumbent interests will have to be fought every step of the way if we want to bring about a sustainable and resilient future.

I want to find out what my guests know now they did not know at the beginning of the week.

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Kate McGinty?

MCGINTY: Thanks.

Mine is a DOD piece and some good news. During the height of the election campaign, on a partisan move, the House took out dollars from DOD's budget for energy efficiency and renewable energy. The good news is post-election, it's restored. That's important.

DOD is the biggest consumer of energy. So, great market for renewables and efficiency.

Second, DOD has become a great driver of innovation and energy technology. Just like DARPA did on the Internet.

The last one is something that Dave touched on, the credibility of renewables. When you are talking security -- and DOD cares -- it brings in a whole different perspective in furtherance of renewables and efficiency.

HAYES: Yes. And, obviously, there is a tremendous amount of research dollars in the world of the Pentagon as we saw it with the development of DARPA and things like that. And a lot of times, technologies that begin at military technology, GPS is the best example, right, started as military technology and then become broadly successful in the public and cost comes down.

MCGINTY: Absolutely. And we're back on track now for good news.

HAYES: Bob?

FRELING: Last week, NASA released images from their visible infrared imaging radiometer suit. I'm now told that basically it's a satellite using high resolution, visible and infrared imaging to reveal the most detailed images of earth at night that we've ever seen.

And, for me, that was just another reminder of the reality in which we live where you have 1.5 billion people without power. You look at Africa at night, and you see it's basically a continent shrouded in darkness. And to me, that's something we keep needing to remind ourselves.

You know, for any of your viewers that want to know what they can do to help bring light and power.

HAYES: To get to that \$1 billion budget.

FRELING: Absolutely. And hope to the poorest people in the world. I would like to welcome them to visit our Web site, which is SELF.org. A little bit goes a long way.

HAYES: For full disclosure, I always give to your organization every year. And I think it's an incredibly worthy organization to give to. And folks should definitely check that out, SELF.org.

Shalini?

RAMANATHAN: I learned that Rio Tinto, the big mining company, is using wind turbines for a diamond mine in northern Canada, and they're doing it not for any kind of environmental reasons but because it's the only reliable source of fuel there. So, I think it points out, there are many reasons to do renewables and in a lot of context, they are the best source of electricity for people.

HAYES: And is that a situation where we're talking about before where you can basically just have power generation local and not have to be hooked up to the grid or not have to extend lines out, et cetera?

RAMANATHAN: It is. And I think it's important to point out that, you know, renewables can happen a lot of different ways. You can do what Bob is doing and have solar panels on people's roofs, which is happening in the U.S. as well. Or you can have the big power projects that are big wind turbines like what my company has done and others have done, and big solar projects.

So, really, wind and solar can be either grid connected or stand-alone. It depends on the problem you are trying to solve.

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HAYES: Dave?

ROBERTS: It has been taken for granted by politics watchers that at the federal level, climate politics is broken, nothing out of the federal government. But it turns out not to be true. There is a provision of the Clean Air Act that Obama can use to reduce total U.S. carbon emissions 10 percent by 2020 with the stroke of his pen without permission from Congress.

So, he's got no excuse now. And if people are looking for a place to focus their energy on trying to make something actually happen here, this is a tool that is laying on the table. And, right now, the EPA is very nervous, for obvious reasons, about using it and could use some bucking up, I think.

HAYES: The EPA is in the midst of a process internal about what rules are going to come out. They have come out with some rules and others. The Supreme Court has authorized them to regulate carbon under the Clean Air Act. So, they have that -- they have that legal authority.

And NRDC has put out this report sketching out a way they could go about doing it in a plausible fashion that wouldn't be too much.

ROBERTS: Yes. And if you are interested in the details, I wrote it up at Grist.org, which also deserves \$1 billion.

HAYES: Just throwing around billions here.

My thanks to Kathleen McGinty from the sustainable construction company WESTON Solutions, Bob Freling from the Solar Electric Life Fund, SELF.org, Shalini Ramanathan from the wind energy company RES Americas, and Dave Roberts from Grist.org. Thanks for getting up.

Thank you for joining us today for UP.

Join us tomorrow, Sunday morning at 8:00 when we'll have Dan Savage. He's getting married tomorrow. The first day it will be legal in Washington state.

I sat down with him last night for a bottle of champagne at this desk for an amazing talk about same-sex marriage and what it means for the gay community, Supreme Court's decision to hear a challenge to DOMA, Defense of Marriage Act -- all of that we will have for you tomorrow. I'm really excited. It was a great, great conversation with Dan.

Coming up next is "MELISSA HARRIS-PERRY". On today's "MHP", "Reefer Revolution", recreational marijuana use in Washington state is now legal. Are we seeing the beginning of the end of a misguided harmful war on drugs? That and more on "MELISSA HARRIS PERRY", coming up next.

We'll see you right here tomorrow at 8:00. Thanks for getting UP.

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# **EPA & Hydraulic Fracturing - Dec. 10**

**Cuomo bets on a new face  
Times Union**

**12/10/2012**

A university president and doctor takes over as NYRA's chairman

Cornell University President David Skorton. (Cornell University)

David Skorton, Cornell University's 12th president acknowledges the audience's applause Thursday, Sept. 7, 2006, during his Inauguration ceremony at the university's historic Arts Quad in Ithaca, N.Y. (AP Photo/The Post-Standard, Gloria Wright) \*\*MANDATORY CREDIT, NO MAGS, NO SALES, TV OUT, NO ARCHIVE\*\*

The Dalai Lama, center, bows to Cornell University president David Skorton, left, after introductions during a visit to Cornell University in Ithaca, N.Y., Tuesday, Oct. 9, 2007. Interpreter Thubtan Jinpa is pictured right. (AP Photo/Kevin Rivoli)

Times Union staff photo by Cindy Schultz President David Skorton, center, poses on campus Wednesday, Aug. 30, 2006, at Cornell University in Ithaca, N.Y. Skorton is the new president of the university. (CINDY SCHULTZ)

Cornell University President David Skorton has never seen the horses run at the state's three most famous racetracks.

He isn't a skilled handicapper or a reader of the Daily Racing Form.

"I really do not know much about horse racing," Skorton said during an interview squeezed into a packed schedule.

Yet he is the new chairman of the New York Racing Association, and he is just beginning to get acquainted with the deep-seated troubles plaguing the state's thoroughbred racing industry.

And just as he favors a moratorium on leasing Cornell's 15,000 acres for hydraulic fracturing before more is known about the natural gas drilling technique's potential health effects, Skorton is moving deliberately in the NYRA assignment handed to him by Gov. Andrew Cuomo.

On Wednesday, Skorton will travel from the land of the Marcellus Shale in Ithaca to Manhattan to take the reins of the reputation-scarred racing association. It will be his first meeting presiding over the statutorily restructured board of trustees of the not-for-profit, whose series of management missteps and financial problems led to a government takeover revealed in May.

Skorton's position with NYRA is unpaid, and he will retain his post at Cornell.

Already, Skorton is insisting on sunshine. His debut marks the first meeting in the 55-year history of NYRA that will be open to the public – even via webcast. Two weeks ago, he pushed NYRA to do something it was initially unwilling to do: release its third-quarter financial report to the media.

Skorton, 63, was Cuomo's surprise selection in October to chair the now-17-member NYRA "reorganization" board, which has been slimmed from 25 and for the next three years will be stocked with appointees of Cuomo and the Legislature.

Although Skorton is entering unfamiliar thoroughbred territory, he is also doing what he tells students to do — "put yourself into an uncomfortable situation." He hopes to use his past experiences in academia, medicine and life to figure out what's needed to improve the racing association, and he's drawing from a background unlike that of traditional NYRA board members, who typically have come from the wealthy horse set.

Skorton has never been to Saratoga Race Course or Belmont Park, and only recently stopped by Aqueduct Racetrack. On that trip – just after Superstorm Sandy hit, with racing canceled – he met with NYRA management and employees, and operators of Resorts World Casino. "For many of the ins and outs of the process ... I am in a listening mode," he said.

Although Skorton can speak at length in a dry, matter-of-fact way on several topics, he doesn't mind letting others talk. He

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is known as a leader with an ability to steer a group to a decision. "I think I know what good governance is," Skorton said.

Several people describe him as a patient consensus-builder.

In accepting the NYRA assignment, Skorton stepped down as co-chairman of the governor's Southern Tier Regional Economic Development Council. The panel was charged with coming up with job-creating priorities for a region that could see a massive job spurt if the Cuomo administration decides to allow hydrofracking.

During about a dozen public meetings of the regional council, the pros and cons of deep rock drilling were aired, with both sides delivering strong arguments on perhaps the most-divisive issue in the communities surrounding Cornell.

In the end, Skorton authored a position paper that essentially moved the matter off the table.

"You could say we punted, but it really wasn't our jurisdiction," said G. Thomas Tranter, the co-chairman of the council. "... This decision was not going to be made by us, but the governor and perhaps EPA, and because it was out of our hands we shouldn't spend any more time on it. But he lead us to that conclusion."

Skorton said that fracking is an extremely complex issue. "My personal view is we're in a bind because of the economic development potential, but ... I'm a doctor," he said. "There are things that end up being harmful that you didn't know in the beginning. But the potential for fracking is big. My position is to continue to try to understand the effects."

Tranter has come to respect him enormously. "He runs a good meeting," said the president of Corning Enterprises. "He has a knack ... even when there's some tension, of cracking some self-deprecating joke."

In the interview with the Times Union, Skorton asked if he could use the reporter's first name, and joked that the reporter could refer to him as "your eminence."

Skorton is a first-generation American and the first in his family to seek a formal education beyond high school. His father immigrated from Belarus and opened a shoe store. He urged his son to pursue an education.

Skorton, who has a passion for jazz (he plays flute and saxophone), became a psychology major but was drawn to medicine late in his college career. He applied to 11 medical schools and was rejected by all but Northwestern. He became a cardiologist working primarily with young people with heart defects, many of whom died before adulthood.

He now tells students about the thin line between the powerful and the powerless, the need for humility and humanity, the value of curiosity and the unpredictability of life.

"No matter how much I learned about the diagnostic process ... I would lose some patients," he said. "I learned the importance of listening ... rather than assuming the role of the all-knowing doctor ... understanding that life is unbelievably precious. It's important to make every day count."

He got into research, studying biomedical and electrical engineering technologies to develop imaging systems. During his 25 years at the University of Iowa, Skorton worked his way up the academic ranks into administration, eventually becoming its president. The only person to sue him in federal court during his Iowa tenure calls him a gentleman. "I thought he was a fantastic president," said David A. Johnson, a veteran of the registrar's office who unsuccessfully litigated to win family leave for fathers. "I was sorry to see him leave."

Six years ago, Skorton was selected to become Cornell's 12th president after a nationwide search. He was paid \$854,282 last year by the school.

"He's one of the most capable and balanced and fair-minded people I have ever met," said Frank H.T. Rhodes, whose own tenure as Cornell's president ran from 1977 to 1995. He said Skorton took over during a perilous time of asset depletion following the Wall Street collapse, and was able to cut staff and balance a budget without killing programs and morale.

Faculty, peers, students and alumni praise him. He is partly responsible for Cornell's ability to reach \$4 billion in donations during its current fund-raising quest, although Skorton is quick to credit others. The school also won a competition against Stanford University to create a \$2 billion technology campus in New York City by developing a long-range plan and convincing an alum to give \$350 million in seed money while securing a partnership with Technion-Israel Institute of

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Technology. Skorton says he was just part of a team that got that Roosevelt Island campus funded and approved.

Key trustees say his success comes from good planning and outstanding marketing.

"David will work very well with the various constituencies within the racing industry in New York state," said Stephen B. Ashley, a Rochester businessman and Cornell trustee who has seen him in one-on-one and big group meetings presenting his vision for Cornell. "This is a man of impeccable integrity. There is no personal agenda or bias except trying to make it better."

Skorton said he will conduct public hearings to let anyone weigh in on the future of racing, and of NYRA. His goals at the onset are to develop equine health – using Cornell's veterinarian school for help – and "to think broadly about the economic development potential of the racetracks." He said he will set up committees to share work, but will personally take on the task of finding NYRA's next chief executive officer.

He said NYRA employees, like any other constituency, should have input with him and the board.

Cornell students remark on the opportunity for such give-and-take with Skorton. It's something he has encouraged – handing out his email address, showing up for forums and seeking feedback on his regular columns in the campus newspaper and on blogs.

Although he isn't promising to sleep in the backstretch quarters of the low-wage barn workers and hot walkers, he and his wife, Robin Davisson – a professor of veterinary medicine and the director of graduate studies for Cornell's Molecular and Integrative Physiology program – have roomed in a freshman dormitory the first few weeks of each semester to check the pulse of students.

Cornell Daily Sun Editor Juan Forrer is one of several students who said Skorton is easy to engage. "He always has a very solid grasp of what is going on," Forrer said. "He is very deliberative. ... He hears all sides and determines his opinions after a good deal of thought; it's not impulsive."

Besides the financial cliff Skorton had to avoid at Cornell, several serious student life issues got his attention. One involved a rash of suicides in which youngsters jumped into gorges on and near campus. The school responded by installing temporary barriers on several bridges. That fencing is now being replaced by netting.

Skorton cracked down on hazing and binge drinking, a special problem at initiation events at fraternities — the residences that once housed members of Cornell's board. A new policy requires frats to register if they are going to have a party, and freshmen are prohibited from drinking unless they're 21 and in the frat.

Skorton said he learned a good lesson from a Cornell freshman who, after reading several of his columns, told him that his writing lacked concision ("sucks" is the adjective Skorton uses). He needed to get to the point quicker. Skorton – who promptly changed his writing style – felt "immense joy" that the student felt empowered enough to approach him. The encounter, he said, reinforced the school's tradition of questioning authority.

In collecting information about the world of thoroughbred racing, Skorton said he will try to lead an independent NYRA board but will also listen to Cuomo and others. He said he will "cast a wide net" to better understand the equine industry and diagnose problems.

One adviser will be Cornell Trustee Jerry Bilinski, a Chatham veterinarian and former chairman of the state Racing and Wagering Board. NYRA "needs shock therapy," Bilinski said. "There's a history with NYRA; a culture, you could say."

He said given the association's track record – an indictment for its role in tax evasion, bankruptcy, overcharging bettors and chronic insularity – Skorton's leadership is encouraging, although Bilinski is concerned that several past NYRA trustees remain on the board and might be obstacles to change.

Cornell Vice Chairman Andrew H. Tisch, chairman of the executive committee of Manhattan-based Loews Corp., said he has no doubt that Skorton will point NYRA in the right direction.

"He's used to dealing with a complex corporation with empowered constituencies, and doing it in public," Tisch said. "The governor and the state are lucky to have him. The governor bet on the best horse on this one."

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# **EPA & Hydraulic Fracturing - Dec. 10**

## **New York Fracking Rules: Regulators Taking Public Comments On Revised Gas Drilling Regulations Huffington Post, The**

**12/09/2012**

A woman holds a sign during a New Yorkers Against Fracking rally at the Capitol in Albany, N.Y., on Tuesday, May 15, 2012.

ALBANY, N.Y. (AP) — New York regulators will begin taking public comments on revised gas-drilling rules this week, though an extensive environmental review outlining the basis for those rules remains incomplete, and neither drillers nor environmentalists are happy lately with the state's work on the issue.

Health and environmental groups have criticized Gov. Andrew Cuomo's Department of Environmental Conservation for issuing the revised regulations before completing a health review or releasing the final version of a massive environmental impact study initiated in 2008. The state has had a moratorium on shale gas development since the study began.

"The governor insisted that he was going to let science dictate his decision, but instead we get regulations that have nothing to do with science," said Sandra Steingraber, a leader of New Yorkers Against Fracking.

Gas industry representatives say the revised regulations are stricter than those proposed in September 2011 and ignore numerous industry requests for changes to provisions they consider arbitrary and inflexible.

Even the revision process itself has come under fire. DEC posted the voluminous revised regulatory document on its website the day before a deadline last month and filed for a 90-day extension to finalize rules for the controversial drilling technology known as fracking. The highly technical document was not accompanied by any summary of changes. The agency will take public comment from Dec. 12 through Jan. 11, and the new deadline to finalize the rules is Feb. 27.

"For the average member of the public, it's not entirely clear all the changes that have been made," said Katherine Nadeau of Environmental Advocates.

In high-volume hydraulic fracturing, or fracking, large volumes of chemically treated water mixed with sand are injected into a well to crack shale and free natural gas. The technology has made it possible to tap into deep reserves of gas but has also raised concerns about pollution. The industry and federal officials say the practice is safe when done properly but some scientists say more research is needed on potential air and water impacts.

Changes to New York's proposed regulations include increasing the distance from well sites to occupied homes or buildings to 500 feet, said Tom West, an Albany lawyer who represents major gas-drilling companies. Originally it was 100 to 150 feet. As before, a landowner can grant the driller a waiver to the 500-foot setback, but the new rules require the driller to also get approval from DEC, West said. That would be a complicated process that may require hearings.

The 500-foot distance between well sites and water supplies was expanded to include water for crops and livestock as well as human drinking water.

"There are significant changes to require public disclosure of chemicals used," West said. "Essentially, they've made an effort to bring New York into conformity with the growing trend in other states to require chemical disclosure."

The new regulations also introduced the possibility of imposing fees to recoup the cost of the state's environmental review, said Yvonne Hennessey, another gas industry lawyer. "It's unclear from the text what their intentions are; it's very vague," she said.

A cap on bonding, set at \$2 million in the 2011 version of the regulations, has been removed, leaving the amount of bonding required of drillers up to the discretion of DEC, Hennessey said.

There are new requirements to allow the public 15 days to comment on permit applications and to give advance notice of permit applications to municipalities, which were previously notified only when a drilling permit was issued.

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New requirements say residential water well testing must be done before there's any site disturbance rather than just before drilling, and results must be reported to the state rather than just the landowner. If subsequent testing after drilling shows changes from that initial testing, it must be reported to DEC within five days. There's also some provision for groundwater monitoring, but it's not clearly spelled out, Hennessey said.

It's unclear whether well testing and other water monitoring results will be accessible to the public, she said. One of the criticisms health and environmental groups make of industry is that it's impossible to track the safety record of drillers because any contamination reports are settled privately between the company and landowner.

"There are very few changes in response to industry comments," West said. "The biggest issue industry was looking for was a means to get a variance from some of the restrictions by offering enhanced environmental controls. Under the inflexible requirements set forth in these regulations, there will be areas of the state with significant shale resources that will be impossible to develop."

Proposed NY regulations: <http://bit.ly/VmJPaC>

## **State Lawmakers And Environmental Activists Express Opposition To Hydro Fracking**

NEW YORK, NY - JANUARY 11: Opponents of hydraulic fracturing in New York state attend a news conference and rally against hydraulic fracturing, also known as fracking, on January 11, 2012 in New York City. The event, which was held on the steps of City Hall, called for an end to the controversial gas drilling method as environmental groups increasingly warn about contamination of the state's aquifers that could poison its drinking water. (Photo by Spencer Platt/Getty Images)

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## **Department Of Environmental Conservation Holds Hydro Fracking Hearing**

NEW YORK, NY - NOVEMBER 30: Opponents and supporters of gas-drilling, or fracking, walk into the last of four public hearings on proposed fracking regulations in upstate New York on November 30, 2011 in New York City. Fracking, a process that injects millions of gallons of chemical mixed water into a well in order to release gas, has become a contentious issue in New York as critics of the process believe it contaminates drinking water among other hazards. New York City gets much of its drinking water from upstate reservoirs. If the regulations are approved, drilling in the upstate New York Marcellus Shale could begin next year. (Photo by Spencer Platt/Getty Images)

## **Cuadrilla Shale Fracking Plant**

PRESTON, LANCASHIRE - OCTOBER 07: Engineers on the drilling platform of the Cuadrilla shale fracking facility on October 7, 2012 in Preston, Lancashire. The controversial method of extracting gas by pumping high pressure water and chemicals into shale formations deep underground has been blamed for two minor earthquakes in the surrounding region. Environmental campaigners are calling for a halt to the drilling of what Cuadrilla believe could be significant reserves of natural gas. (Photo by Matthew Lloyd/Getty Images)

## **Cuadrilla Shale Fracking Plant**

PRESTON, LANCASHIRE - OCTOBER 07: Engineers at work on the drilling platform of the Cuadrilla shale fracking facility on October 7, 2012 in Preston, Lancashire. The controversial method of extracting gas by pumping high pressure water and chemicals into shale formations deep underground has been blamed for two minor earthquakes in the surrounding region. Environmental campaigners are calling for a halt to the drilling of what Cuadrilla believe could be significant reserves of natural gas. (Photo by Matthew Lloyd/Getty Images)

## **Cuadrilla Shale Fracking Plant**

## **EPA & Hydraulic Fracturing - Dec. 10**

PRESTON, LANCASHIRE - OCTOBER 07: General views of the Cuadrilla shale fracking facility on October 7, 2012 in Preston, Lancashire. The controversial method of extracting gas by pumping high pressure water and chemicals into shale formations deep underground has been blamed for two minor earthquakes in the surrounding region. Environmental campaigners are calling for a halt to the drilling of what Cuadrilla believe could be significant reserves of natural gas. (Photo by Matthew Lloyd/Getty Images)

Cuadrilla Shale Fracking Plant

PRESTON, LANCASHIRE - OCTOBER 07: Engineers look at the Cuadrilla shale fracking facility on October 7, 2012 in Preston, Lancashire. The controversial method of extracting gas by pumping high pressure water and chemicals into shale formations deep underground has been blamed for two minor earthquakes in the surrounding region. Environmental campaigners are calling for a halt to the drilling of what Cuadrilla believe could be significant reserves of natural gas. (Photo by Matthew Lloyd/Getty Images)

Cuadrilla Shale Fracking Plant

PRESTON, LANCASHIRE - OCTOBER 07: A lump of shale rock on display at the Cuadrilla shale fracking facility on October 7, 2012 in Preston, Lancashire. The controversial method of extracting gas by pumping high pressure water and chemicals into shale formations deep underground has been blamed for two minor earthquakes in the surrounding region. Environmental campaigners are calling for a halt to the drilling of what Cuadrilla believe could be significant reserves of natural gas. (Photo by Matthew Lloyd/Getty Images)

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Cuadrilla Shale Fracking Plant

PRESTON, LANCASHIRE - OCTOBER 07: Drill heads on display at the entrance to the Cuadrilla shale fracking facility on October 7, 2012 in Preston, Lancashire. The controversial method of extracting gas by pumping high pressure water and chemicals into shale formations deep underground has been blamed for two minor earthquakes in the surrounding region. Environmental campaigners are calling for a halt to the drilling of what Cuadrilla believe could be significant reserves of natural gas. (Photo by Matthew Lloyd/Getty Images)

Cuadrilla Shale Fracking Plant

PRESTON, LANCASHIRE - OCTOBER 07: An engineer displays a lump of shale rock at the Cuadrilla shale fracking facility on October 7, 2012 in Preston, Lancashire. The controversial method of extracting gas by pumping high pressure water and chemicals into shale formations deep underground has been blamed for two minor earthquakes in the surrounding region. Environmental campaigners are calling for a halt to the drilling of what Cuadrilla believe could be significant reserves of natural gas. (Photo by Matthew Lloyd/Getty Images)

Hydraulic Fracturing Prevention Press Conference

NEW YORK, NY - APRIL 25: Actor/director Mark Ruffalo (C) speaks at the Hydraulic Fracturing prevention press conference urging the protection of the drinking water source of 15 million Americans at Foley Square on April 25, 2011 in New York City. (Photo by D Dipasupil/Getty Images)

# **EPA & Hydraulic Fracturing - Dec. 10**

Hydraulic Fracturing Prevention Press Conference

NEW YORK, NY - APRIL 25: (L-R) Actor/director Mark Ruffalo, Denise Katzman, Wenonah Hauter, and Water Defense co-founder/campaign director Claire Sandberg attend the Hydraulic Fracturing prevention press conference urging the protection of the drinking water source of 15 million Americans at Foley Square on April 25, 2011 in New York City. (Photo by D Dipasupil/Getty Images)

Josh Fox on Obama, the EPA, and House Republicans Who Had Him Arrested

HuffPost Green Editor Joanna Zelman talks to Josh Fox, director of the documentary 'Gasland,' about hydro-fracking, the EPA, and the House Republicans who had him arrested during a Congressional hearing.

Game Changer in Green: Mark Ruffalo

The expertise and the grassroots zeal Mark Ruffalo has brought to the issue of fracking is changing the game in green.

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# **EPA & Hydraulic Fracturing - Dec. 10**

## **EPA: Fracking may cause groundwater pollution KENS-TV - Online**

**12/09/2012**

SACRAMENTO, CA - JULY 25: Protestors hold signs against fracking during a demonstration outside of the California Environmental Protection Agency (EPA) headquarters on July 25, 2012 in Sacramento, California. Dozens of environmental activists staged a "Stop Fracking With California" demonstration outside the California EPA headquarters ahead of public workshop hosted by the Division of Oil Gas and Geothermal Resources where protestors are planning to voice their opposition to the rushed regulatory of fracking and the many threats to the environment imposed by the process of hydraulic fracking for oil and gas. (Photo by Justin Sullivan/Getty Images)

CHEYENNE, Wyo. - CHEYENNE, Wyo. (AP) – The U.S. Environmental Protection Agency announced Thursday for the first time that fracking – a controversial method of improving the productivity of oil and gas wells – may be to blame for causing groundwater pollution.

The draft finding could have significant implications while states try to determine how to regulate the process. Environmentalists characterized the report as a significant development though it met immediate criticism from the oil and gas industry and a U.S. senator.

The practice is called hydraulic fracturing and involves pumping pressurized water, sand and chemicals underground to open fissures and improve the flow of oil or gas to the surface.

The EPA's found that compounds likely associated with fracking chemicals had been detected in the groundwater beneath Pavillion, a small community in central Wyoming where residents say their well water reeks of chemicals. Health officials last year advised them not to drink their water after the EPA found low levels hydrocarbons in their wells.

The EPA announcement could add to the controversy over fracking, which has played a large role in opening up many gas reserves, including the Marcellus Shale in the eastern U.S. in recent years.

The industry has long contended that fracking is safe, but environmentalists and some residents who live near drilling sites say it has poisoned groundwater.

The EPA said its announcement is the first step in a process of opening up its findings for review by the public and other scientists.

"EPA's highest priority remains ensuring that Pavillion residents have access to safe drinking water," said Jim Martin, EPA regional administrator in Denver. "We look forward to having these findings in the draft report informed by a transparent and public review process."

The EPA also emphasized that the findings are specific to the Pavillion area. The agency said the fracking that occurred in Pavillion differed from fracking methods used elsewhere in regions with different geological characteristics.

The fracking occurred below the level of the drinking water aquifer and close to water wells, the EPA said. Elsewhere, drilling is more remote and fracking occurs much deeper than the level of groundwater that would normally be used.

Environmentalists welcomed the news of the EPA report, calling it an important turning point in the fracking debate.

"This is an important first indication there are potential problems with fracking that can impact domestic water wells. It's I think a clarion call to industry to make sure they take a great deal of care in their drilling practices," said Steve Jones with the Wyoming Outdoor Council.

Pavillion resident John Fenton, chairman of the group Pavillion Area Concerned Citizens, applauded the EPA for listening to the homeowners with contaminated water.

"Those of us who suffer the impacts from the unchecked development in our community are extremely happy the contamination source is being identified," Fenton said.

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Calgary, Alberta-based Encana owns the Pavillion gas field. An announced \$45 million sale to Midland, Texas-based Legacy Reserves fell through last month amid what Encana said were Legacy's concerns about the EPA investigation.

Encana spokesman Doug Hock said there was much to question about the draft study.

The compounds EPA said could be associated with fracking, he said, could have had other origins not related to gas development.

"Those could just have likely been brought about by contamination in their sampling process or construction of their well," Hock said.

The low levels of hydrocarbons found in local water wells likewise haven't been linked to gas development and substances such as methane itself are naturally occurring in the area.

"There are still a lot of questions that need to be answered. This is a probability and it is one we believe is incorrect," Hock said.

Sen. James Inhofe said the study was "not based on sound science but rather on political science."

"Its findings are premature, given that the Agency has not gone through the necessary peer-review process, and there are still serious outstanding questions regarding EPA's data and methodology," the Oklahoma Republican said in a statement.

Wyoming last year became one of the first states to require oil and gas companies to publicly disclose the chemicals used in fracking. Colorado regulators are considering doing the same.

The public and industry representatives packed an 11-hour hearing on the issue in Denver on Monday. They all generally supported the proposal but the sticking point is whether trade secrets would have to be disclosed and how quickly the information would have to be turned over.

And while the EPA emphasized the Wyoming findings we're highly localized, the report is likely to reverberate.

The issue has been highly contentious in New York, where some upstate residents and politicians argue that the gas industry will bring desperately needed jobs while others demand a ban on fracking to protect water supplies. New York regulators haven't issued permits for gas drilling with high-volume hydraulic fracturing in the Marcellus Shale since they began an extensive environmental review in 2008.

Kate Sinding, an attorney with the Natural Resources Defense Council in New York City, said in an e-mail Thursday that the EPA in Wyoming is now recognizing what other experts and families in fracking communities have known for some time: "Fracking poses serious threats to safe drinking water."

Associated Press writers Colleen Slevin in Denver and Mary Esch in Albany, N.Y. contributed to this report.

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## **Cows Dropping Dead, Farmers Getting Sick: How Fracking Is Threatening Our Food Care2 News Network**

**12/08/2012**

Kit B. (300)

Friday December 7, 2012, 4:57 pm

(Photo credit: Alternet)

This article was produced in collaboration with the Food & Environment Reporting Network, an investigative reporting nonprofit focusing on food, agriculture and environmental health.

In a Brooklyn winery on a sultry July evening, an elegant crowd sips rosé and nibbles trout plucked from the gin-clear streams of upstate New York. The diners are here, with their checkbooks, to support a group called Chefs for the Marcellus, which works to protect the foodshed upon which hundreds of regional farm-to-fork restaurants depend. The foodshed is coincident with the Marcellus Shale, a geologic formation that arcs northeast from West Virginia through Pennsylvania and into New York State. As everyone invited here knows, the region is both agriculturally and energy rich, with vast quantities of natural gas sequestered deep below its fertile fields and forests.

In Pennsylvania, the oil and gas industry is already on a tear—drilling thousands of feet into ancient seabeds, then repeatedly fracturing (or fracking) these wells with millions of gallons of highly pressurized, chemically laced water, which shatters the surrounding shale and releases fossil fuels. New York, meanwhile, is on its own natural-resource tear, with hundreds of newly opened breweries, wineries, organic dairies and pastured livestock operations—all of them capitalizing on the metropolitan area's hunger to localize its diet.

But there's growing evidence that these two impulses, toward energy and food independence, may be at odds with each other.

Tonight's guests have heard about residential drinking wells tainted by fracking fluids in Pennsylvania, Wyoming and Colorado. They've read about lingering rashes, nosebleeds and respiratory trauma in oil-patch communities, which are mostly rural, undeveloped, and lacking in political influence and economic prospects. The trout nibblers in the winery sympathize with the suffering of those communities. But their main concern tonight is a more insidious matter: the potential for drilling and fracking operations to contaminate our food. The early evidence from heavily fracked regions, especially from ranchers, is not reassuring.

\* \* \*

Jacki Schilke and her sixty cattle live in the top left corner of North Dakota, a windswept, golden-hued landscape in the heart of the Bakken Shale. Schilke's neighbors love her black Angus beef, but she's no longer sharing or eating it—not since fracking began on thirty-two oil and gas wells within three miles of her 160-acre ranch and five of her cows dropped dead. Schilke herself is in poor health. A handsome 53-year-old with a faded blond ponytail and direct blue eyes, she often feels lightheaded when she ventures outside. She limps and has chronic pain in her lungs, as well as rashes that have lingered for a year. Once, a visit to the barn ended with respiratory distress and a trip to the emergency room. Schilke also has back pain linked with overworked kidneys, and on some mornings she urinates a stream of blood.

Ambient air testing by a certified environmental consultant detected elevated levels of benzene, methane, chloroform, butane, propane, toluene and xylene—compounds associated with drilling and fracking, and also with cancers, birth defects and organ damage. Her well tested high for sulfates, chromium, chloride and strontium; her blood tested positive for acetone, plus the heavy metals arsenic (linked with skin lesions, cancers and cardiovascular disease) and germanium (linked with muscle weakness and skin rashes). Both she and her husband, who works in oilfield services, have recently lost crowns and fillings from their teeth; tooth loss is associated with radiation poisoning and high selenium levels, also found in the Schilkes' water.

State health and agriculture officials acknowledged Schilke's air and water tests but told her she had nothing to worry about. Her doctors, however, diagnosed her with neurotoxic damage and constricted airways. I realized that this place is

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killing me and my cattle, Schilke says. She began using inhalers and a nebulizer, switched to bottled water, and quit eating her own beef and the vegetables from her garden. (Schilke sells her cattle only to buyers who will finish raising them outside the shale area, where she presumes that any chemical contamination will clear after a few months.) My health improved, Schilke says, but I thought, Oh my God, what are we doing to this land?

Schilke's story reminds us that farmers need clean water, clean air and clean soil to produce healthful food. But as the largest private landholders in shale areas across the nation, farmers are disproportionately being approached by energy companies eager to extract oil and gas from beneath their properties. Already, some are regretting it.

Earlier this year, Michelle Bamberger, an Ithaca veterinarian, and Robert Oswald, a professor of molecular medicine at Cornell's College of Veterinary Medicine, published the first (and, so far, only) peer-reviewed report to suggest a link between fracking and illness in food animals. The authors compiled case studies of twenty-four farmers in six shale-gas states whose livestock experienced neurological, reproductive and acute gastrointestinal problems. Exposed either accidentally or incidentally to fracking chemicals in the water or air, scores of animals have died. The death toll is insignificant when measured against the nation's livestock population (some 97 million beef cattle go to market each year), but environmental advocates believe these animals constitute an early warning.

Exposed animals are making their way into the food system, and it's very worrisome to us, Bamberger says. They live in areas that have tested positive for air, water and soil contamination. Some of these chemicals could appear in milk and meat products made from these animals.

In Louisiana, seventeen cows died after an hour's exposure to spilled fracking fluid. (Most likely cause of death: respiratory failure.) In north central Pennsylvania, 140 cattle were exposed to fracking wastewater when an impoundment was breached. Approximately seventy cows died; the remainder produced eleven calves, of which only three survived. In western Pennsylvania, an overflowing waste pit sent fracking chemicals into a pond and a pasture where pregnant cows grazed: half their calves were born dead. The following year's animal births were sexually skewed, with ten females and two males, instead of the usual 50-50 or 60-40 split.

In addition to the cases documented by Bamberger, hair testing of sick cattle that grazed around well pads in New Mexico found petroleum residues in fifty-four of fifty-six animals. In North Dakota, wind-borne fly ash, which is used to solidify the waste from drilling holes and contains heavy metals, settled over a farm: one cow, which either inhaled or ingested the caustic dust, died, and a stock pond was contaminated with arsenic at double the accepted level for drinking water.

Cattle that die on the farm don't make it into the nation's food system. (Though they're often rendered to make animal feed for chickens and pigs—yet another cause for concern.) But herd mates that appear healthy, despite being exposed to the same compounds, do: farmers aren't required to prove their livestock are free of fracking contaminants before middlemen purchase them. Bamberger and Oswald consider these animals sentinels for human health. They're outdoors all day long, so they're constantly exposed to air, soil and groundwater, with no break to go to work or the supermarket, Bamberger says. And they have more frequent reproductive cycles, so we can see toxic effects much sooner than with humans.

Fracking a single well requires up to 7 million gallons of water, plus an additional 400,000 gallons of additives, including lubricants, biocides, scale and rust inhibitors, solvents, foaming and defoaming agents, emulsifiers and de-emulsifiers, stabilizers and breakers. About 70 percent of the liquid that goes down a borehole eventually comes up—now further tainted with such deep-earth compounds as sodium, chloride, bromide, arsenic, barium, uranium, radium and radon. (These substances occur naturally, but many of them can cause illness if ingested or inhaled over time.) This super-salty produced water, or brine, can be stored on-site for reuse. Depending on state regulations, it can also be held in plastic-lined pits until it evaporates, is injected back into the earth, or gets hauled to municipal wastewater treatment plants, which aren't designed to neutralize or sequester fracking chemicals (in other words, they're discharged with effluent into nearby streams).

At almost every stage of developing and operating an oil or gas well, chemicals and compounds can be introduced into the environment. Radioactive material above background levels has been detected in air, soil and water at or near gas-drilling sites. Volatile organic compounds—including benzene, toluene, ethylene and xylene—waft from flares, engines, compressors, pipelines, flanges, open tanks, spills and ponds. (The good news: VOCs don't accumulate in animals or plants. The bad news: inhalation exposure is linked to cancer and organ damage.)

Underground, petrochemicals can migrate along fissures through abandoned or orphaned wells or leaky well casings (the oil and gas industry estimates that 60 percent of wells will leak over a thirty-year period). Brine can spill from holding

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ponds or pipelines. It can be spread, legally in some places, on roadways to control dust and melt ice. Truck drivers have also been known to illegally dump this liquid in creeks or fields, where animals can drink it or lick it from their fur.

Although energy companies don't make a habit of telling potential lease signers about the environmental risks they might face, the Securities and Exchange Commission requires them to inform potential investors. In a 2008 filing, Cabot Industries cited well site blowouts, cratering and explosions; equipment failures; uncontrolled flows of natural gas, oil or well fluids; fires; formations with abnormal pressures; pollution and other environmental risks. In 2011, oil companies in North Dakota reported more than 1,000 accidental releases of oil, drilling wastewater or other fluids, with many more releases likely unreported. Between 2008 and 2011, drilling companies in Pennsylvania reported 2,392 violations of law that posed a direct threat to the environment and safety of communities.

\* \* \*

Schilke looks left and right, twice, for oncoming tanker trucks, then scoots down a gravel road in her camo-patterned four-wheeler. She parks alongside a leased pasture about a mile from her house and folds her body through a barbed-wire fence. These guys are much healthier than those I've got at home, she says, puffing as she hikes up a straw-colored hill. There's Judy that's Buttercup those are my little bulls. The black-faced animals turn to face her; some amble through the tall grass and present their foreheads for rubbing. We're upwind of the drill rigs here, Schilke says. They're high enough to miss some of the road dust, and they've got good water. Ever since a heater-treater unit, which separates oil, gas and brine, blew out on a drill pad a half-mile upwind of Schilke's ranch, her own creek has been clogged with scummy growth, and it regularly burps up methane. No one can tell me what's going on, she says. But since the blowout, her creek has failed to freeze, despite temperatures of forty below. (Testing found sulfate levels of 4,000 parts per million: the EPA's health goal for sulfate is 250 parts per million.)

Schilke's troubles began in the summer of 2010, when a crew working at this site continued to force drilling fluid down a well that had sprung a leak. Soon, Schilke's cattle were limping, with swollen legs and infections. Cows quit producing milk for their calves; they lost from sixty to eighty pounds in a week; and their tails mysteriously dropped off. (Lab rats exposed to the carcinogen 2-butoxyethanol, a solvent used in fracking, have lost their tails, but a similar connection with cattle hasn't been shown. In people, breathing, touching or consuming enough of the chemical can lead to pulmonary edema and coma.)

Schilke ranch cow that has lost its tail, one of many ailments found in cattle following hydrofracturing of the Bakken Shale in North Dakota

An inveterate label reader who obsessively tracks her animals' nutritional intake, Schilke couldn't figure out what was wrong. Neither could local veterinarians. She nursed individual cows for weeks and, with much sorrow, put a \$5,000 bull out of its misery with a bullet. Upon examination, the animal's liver was found to be full of tunnels and its lungs congested with pneumonia. Before the year was out, five cows had died, in addition to several cats and two dogs. (Hair testing of Schilke's cats and dogs revealed elevated selenium levels, while water tests showed sulfate at levels high enough, Schilke's vet told her, to cause polio in cattle.) Inside Schilke's house today, where the china cabinets are kept empty for fear of a shattering drill-site explosion, nearly a dozen cats sneeze and cough, some with their heads tilted at a creepy angle.

Before the drilling started, two cars a day traveled down Schilke's gravel road. Now, it's 300 trucks hauling sand, fresh water, wastewater, chemicals, drill cuttings and drilling equipment. Most of the tankers are placarded for hazardous or radioactive material. Drilling and fracking a single well requires 2,000 truck trips, and each pass of a vehicle sends a cyclone of dust and exhaust fumes into the air. Mailbox numbers are obliterated, conversations are choked off, and animals die of dust pneumonia. (More formally known as bovine respiratory disease, the illness is associated with viral, fungal and bacterial infection.)

Ordinarily, Schilke hauls her calves to auction when they're eight months old. Buyers come from everywhere for Dakota cows, she says. The animals are then raised on pasture or in feedlots until they are big enough for slaughter. No longer Schilke cattle, they're soon part of the commodity food system: anonymous steaks and chops on supermarket shelves. Now, Schilke is diffident about selling her animals. I could get good money for these steers, she says, cocking her head toward a pair of sleek adolescents. They seem to be in very good shape and should have been butchered. But I won't sell them because I don't know if they're OK.

\* \* \*

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Nor does anyone else. By design, secrecy shrouds the hydrofracking process, casting a shadow that extends over consumers' right to know if their food is safe. Federal loopholes crafted under former Vice President Dick Cheney have exempted energy companies from key provisions of the Clean Air, Clean Water and Safe Drinking Water Acts, the Toxics Release Inventory, the Resource Conservation and Recovery Act, and the National Environmental Policy Act, which requires a full review of actions that may cause significant environmental impacts. If scientists and citizens can't find out precisely what is in drilling or fracking fluids or air emissions at any given time, it's difficult to test whether any contaminants have migrated into the water, soil or food and whether they can harm humans. It gets even more complicated: without information on the interactions between these chemicals and others already existing in the environment, an animal's cause of death, Bamberger says, is anyone's guess.

Fracking proponents criticize Bamberger and Oswald's paper as a political, not a scientific, document. They used anonymous sources, so no one can verify what they said, Steve Everley, of the industry lobby group Energy In Depth, says. The authors didn't provide a scientific assessment of impacts testing what quaternary ammonium compounds might do to cows that drink it, for example so treating their findings as scientific, he continues, is laughable at best, and dangerous for public debate at worst. (Bamberger and Oswald acknowledge this lack of scientific assessment and blame the dearth of funding for fracking research and the industry's use of nondisclosure agreements.)

No one doubts that fracking fluids have the potential to do serious harm. Theo Colborn, an environmental health analyst and former director of the World Wildlife Fund's wildlife and contaminants program, identified 632 chemicals used in natural-gas production. More than 75 percent of them, she said, could affect sensory organs and the respiratory and gastrointestinal systems; 40 to 50 percent have potential impacts on the kidneys and on the nervous, immune and cardiovascular systems; 37 percent act on the hormone system; and 25 percent are linked with cancer or mutations.

Thanks to public pressure, several states have started to tighten regulations on the cement casings used to line wells, and the Obama administration recently required energy companies to disclose, on the industry-sponsored website [fracfocus.org](http://fracfocus.org), the fracking chemicals used on public land. (States regulate fracking on private land and set different requirements.) Still, information about quantities and concentrations of the chemicals remains secret, as do compounds considered proprietary. Further, no state requires a company to disclose its ingredients until a fracking job is complete. At that point, it's easy to blame the presence of toxins in groundwater on a landowner's use of pesticides, fertilizers or even farm equipment.

Clearly, the technology to extract gas from shale has advanced faster, and with a lot more public funding, than has the study of its various effects. To date, there have been no systematic, peer-reviewed, long-term studies of the health effects of hydraulic fracturing for oil and gas production (one short-term, peer-reviewed study found that fracking emissions may contribute to acute and chronic health problems for people living near drill sites). And the risks to food safety may be even more difficult to parse.

Different plants take up different compounds, says John Stolz, an environmental microbiologist at Duquesne University. For example, rice and potatoes take up arsenic from water, but tomatoes don't. Sunflowers and rape take up uranium from soil, but it's unknown if grasses do. There are a variety of organic compounds, metals and radioactive material that are of human health concern when livestock meat or milk is ingested, says Motoko Mukai, a veterinary toxicologist at Cornell's College of Veterinary Medicine. These compounds accumulate in the fat and are excreted into milk. Some compounds are persistent and do not get metabolized easily.

Veterinarians don't know how long the chemicals may remain in animals, and the Food Safety Inspection Service, part of the US Department of Agriculture, isn't looking for them in carcasses. Inspectors in slaughterhouses examine organs only if they look diseased. It's gross appearance, not microscopic, Bamberger says of the inspections which means that animals either tainted or sickened by those chemicals could enter the food chain undetected.

The USDA focuses mostly on pathogens and pesticide residues, says Tony Corbo, a senior lobbyist for Food and Water Watch. We need to do risk assessments for these fracking chemicals and study tolerance levels. The process, he adds, could take more than five years. In the meantime, fractivists are passing around a food-pyramid chart that depicts chemicals moving from plants into animals, from animals into people, and from people into zombies.

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The relatively small number of animals reported sick or dead invites the question: If oil and gas operations are so risky, why aren't there more cases? There likely are, but few scientists are looking for them. (Who's got the money to study

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this? Colborn asks rhetorically.) Rural vets won't speak up for fear of retaliation. And farmers aren't talking for myriad reasons: some receive royalty checks from the energy companies (either by choice or because the previous landowner leased their farm's mineral rights); some have signed nondisclosure agreements after receiving a financial settlement; and some are in active litigation. Some farmers fear retribution from community members with leases; others don't want to fall afoul of food disparagement laws; or get sued by an oil company for defamation (as happened with one Texan after video of his flame-spouting garden hose was posted on the Internet. The oil company won; the homeowner is appealing).

And many would simply rather not know what's going on. It takes a long time to build up a herd's reputation, says rancher Dennis Bauste, of Trenton Lake, North Dakota. I'm gonna sell my calves, and I don't want them to be labeled as tainted. Besides, I wouldn't know what to test for. Until there's a big wipeout, a major problem, we're not gonna hear much about this. Ceylon Feiring, an area vet, concurs. We're just waiting for a wreck to happen with someone's cattle, she says. Otherwise, it's just one-offs—a sick cow here and a dead goat there, easy for regulators, vets and even farmers to shrug off.

The National Cattlemen's Beef Association takes no position on fracking, nor has it heard from members either concerned by or in favor of the process. And yet it's ranchers and farmers—many of them industry-supporting conservatives—who are, increasingly, telling their stories to the media and risking all. These are the people who have watched helplessly as their livestock suffer and die. It's not our breeding or nutrition destroying these animals, Schilke says, her voice rising in anger. It's the oilfield industry.

However, some institutions that specialize in risk have started to connect the dots. Nationwide Mutual Insurance, which sells agricultural insurance, recently announced that it would not cover damages related to fracking. Rabobank, the world's largest agricultural bank, reportedly no longer sells mortgages to farmers with gas leases. And in the boldest move yet by a government official, Christopher Portier, director of the National Center for Environmental Health at the Centers for Disease Control and Prevention, called for studies that include all the ways people can be exposed, such as through air, water, soil, plants and animals. While the EPA is in the midst of a \$1.9 million study of fracking's impact on water, no government agency has taken up Portier's challenge to study plants and animals.

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The possibility of chemical contamination aside, oil and gas operations have already affected food producers. I lost six acres of hayfields when the gas company put roads in, says Terry Greenwood, a rancher in western Pennsylvania. Now I have to buy more feed for my cattle. (Like other farmers hurt by drilling and fracking, he still pays taxes on his unproductive land.) Others have lost the use of stock ponds or creeks to brine spills.

We've got 12,000 wells in the Bakken, and they each take up six acres, says Mark Trechock, former director of the Dakota Resource Council. That's 72,000 acres right there, without counting the waste facilities, access roads, stored equipment and man camps that go along with the wells. Before the drilling boom, that land might have produced durum wheat, barley, oats, canola, flax, sunflowers, pinto beans, lentils and peas. In Pennsylvania, where nearly 6,500 wells have been drilled since 2000, the Nature Conservancy estimates that thirty acres are directly or indirectly affected for every well pad.

East of the Rockies, intensive drilling and fracking have pushed levels of smog, or ground-level ozone, higher than those of Los Angeles. Ozone significantly diminishes crop yields and reduces the nutritional value of forage. Flaring of raw gas can acidify soil and send fine particulate matter into the air; long-term exposure to this material has been linked to human heart and lung diseases and disruption to the endocrine system. Earlier this year, the Environmental Protection Agency finalized standards that require reductions in airborne emissions from gas wells, although the industry has more than two years to comply.

Besides clean air, farmers need clean water—lots of it. But some farmers now find themselves competing with energy companies for this increasingly precious resource. At water auctions in Colorado, the oil and gas industry has paid utilities up to twenty times the price that farmers typically pay. In Wyoming, ranchers have switched from raising beef to selling their water. Unwilling to risk her animals' health to creek water that's possibly tainted, Schilke spent \$4,000 last summer hauling safe water from town to her ranch. I'd wait in line for hours, she says, usually behind tanker trucks buying water to frack wells.

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# EPA & Hydraulic Fracturing -

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Given the absence of studies on the impacts of drilling and fracking in plants and animals, as well as inadequate inspection and scant traceability in the food chain, it's hard to know what level of risk consumers face when drinking milk or eating meat or vegetables produced in a frack zone. Unless, of course, you're Jacki Schilke, and you feel marginally healthier when you quit eating the food that you produced downwind or downstream from drill rigs. But many consumers—those intensely interested in where and how their food is grown—aren't waiting for hard data to tell them what is or isn't safe. For them, the perception of pollution is just as bad as the real thing. Ken Jaffe, who raises grass-fed cattle in upstate New York, says, "My beef sells itself. My farm is pristine. But a restaurant doesn't want to visit and see a drill pad on the horizon."

Nor do the 16,200 members of the Park Slope Food Co-op in Brooklyn, which buys one cow per week from Jaffe. If hydrofracking is allowed in New York State, the co-op will have to stop buying from farms anywhere near the drilling because of fears of contamination, says Joe Holtz, general manager of the co-op. That's \$4 million in direct sales, with economic multipliers up and down the local food chain, affecting seed houses, creameries, equipment manufacturers and so on.

Already, wary farmers in the Marcellus are seeking land away from the shale. The outward migration is simultaneously raising prices for good farmland in the Hudson River Valley, which lies outside the shale zone, and depressing the price of land over the Marcellus. According to John Bingham, an organic farmer in upstate New York who is involved in regional planning, lower prices entice absentee investors to buy up farmland and gain favorable farm rate tax breaks, even as they speculate on the gas boom. Fracking is not a healthy development for food security in regions near fracking or away from it, Bingham concludes.

Only recently has the Northeast's local-foods movement reached a critical mass, to the point where colleges and caterers trip over themselves in the quest for locally sourced and sustainably grown products. (New York has the fourth-highest number of organic farms in the nation.) But the movement's lofty ideals could turn out to be, in shale-gas areas, a double-edged sword. People at the farmers' market are starting to ask exactly where this food comes from, says Stephen Cleghorn, a Pennsylvania goat farmer.

With a watchful eye on Pennsylvania's turmoil, many New York farmers have started to test their water pre-emptively, in the event that Governor Andrew Cuomo lifts the state's current moratorium on fracking. And in the commercial kitchens of a city obsessed with the provenance of its prosciutto, chefs like Heather Carlucci-Rodriguez, a founder of Chefs for the Marcellus and the executive pastry chef at Manhattan's Print Restaurant, are keeping careful tabs on their regional suppliers.

I have a map of the Marcellus and my farmers on my office wall, Carlucci-Rodriguez says at the Brooklyn winery event. So far, I haven't stopped buying from any one. But I'm a believer in the precautionary principle. She nods to a colleague who's dishing up summer squash with peach slices and ricotta. We shouldn't have to be defending our land and water, she says with a sigh. We should be feeding people.

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By Elizabeth Royte | [alternet](#) |

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